

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

F16FW

LIBRARY OF THE
OFFICE OF EXPERIMENT STATIONS

ED 25 1927

EXPERIMENT STATION FILE



THE FOREST WORKER

November, 1926.

FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON D.C.



THE FOREST WORKER

November, 1926

Published bimonthly by the Forest Service,
U. S. Department of Agriculture, Washington, D. C.

CONTENTS

	<u>Page</u>
Announcements	3-4
State forestry departments and organizations.	5-18
Education and extension	19-26
Forest Service notes	27-38
General forest news	39-48
Foreign notes	49-52
Personals	53-56
Bibliography	57-61

ANNOUNCEMENTS

American Foresters' Annual Meeting

The Society of American Foresters will hold its annual meeting in Philadelphia December 29 and 30, in conjunction with the American Association for the Advancement of Science.

American Forestry Association Meeting at New Haven

The fifty-second annual meeting of the American Forestry Association will be held January 28 and 29 at New Haven, Conn. The Connecticut Forestry Association will join in the meeting, and the Canadian Forestry Association has been asked to participate. The plan is to popularize the sessions, omitting technical papers and discussions of interest only to scientists. The facilities of the Yale School of Forestry will be placed at the disposal of the convention.

Western Forestry and Conservation Meeting at Victoria

The Western Forestry and Conservation Association will hold its annual meeting, and a forest management conference of private and official Pacific Coast agencies, at Victoria, B. C., December 6-9. On the first day protection and publicity committees representing private associations and the official forestry organizations of British Columbia, the States, and the United States, will meet to discuss details of Clarke-McNary cooperation, Weather Bureau cooperation, air patrol, fire equipment, the smoking menace, and educational campaigns. On December 7 and 8 and the forenoon of December 9 will be held the forestry, protection, and insurance sessions of the general conference, which will include talks and discussions on the following topics: Better fire organization to meet bad situations; logging camp problems; law enforcement; new legislation; equipment development; insurance possibilities; systematizing fire publicity; reforestation measures; slash disposal; and insects and tree diseases.

Regional Prizes for Waste-Prevention Methods

Several regional contests for devices or methods that will prevent waste in logging and milling have been arranged to supplement the national contest for such devices in which the National Lumber Manufacturers' Association is offering \$2,000 in prizes. The organizations sponsoring these regional contests and the prizes they offer are as follows: the Northern Hemlock and Hardwood Association, \$100, \$50, and \$25; the California White and Sugar Pine Manufacturers' Association, \$50 and \$25; the North Carolina Pine Association, \$25, \$15, and \$10; and the California Redwood Association, \$50 and \$25.

The I. Stephenson Mills, Wells, Mich., has set an interesting example for other individual lumber companies by offering a prize of \$25 for the best waste-prevention device originated by any of its employees.

Proceedings of the World Forestry Congress

The International Institute of Agriculture has announced that the proceedings of the World Forestry Congress at Rome, April 29-May 5, 1926, will be published by it before the end of the present year. The proceedings will include some three hundred reports submitted to the congress, and will form five octavo volumes of about 3,500 pages. These will be divided as follows:

Volume I: Regulations and program of the congress, list of members, text of the resolutions and recommendations approved by the congress, general report, etc.

Volume II: Reports on forestry in its statistical, political, economic, and legal aspects, and on instruction in forestry.

Volume III: Reports on trade and industry in timber and other forest products.

Volume IV: Reports on technical problems relating to forestry and forestry operations.

Volume V: Reports on control of torrent waters, reforestation of mountain areas, plant diseases and other injuries, fish and game, touring, propaganda, and tropical forest resources and forest utilization.

Prices of the complete work are as follows:

To members and associate members 175 lire

To nonmembers whose orders are booked before
November 30, 1926 250 lire

To nonmembers whose orders are booked after
November 30, 1926 300 lire

Payment will be accepted in American money according to the current rate of exchange, now about 25 lire to the dollar. Orders should be placed with the Publications Office, International Institute of Agriculture, Villa Umberto I, Rome, Italy.

A list of the reports to be included in the proceedings can be obtained either from the institute or from S. T. Dana, Northeastern Forest Experiment Station, Amherst, Mass.

STATE FORESTRY DEPARTMENTS AND ORGANIZATIONS

State Foresters Meet in Maryland

Distance is no deterrent to State foresters; for they came from far and near, from the Pacific Coast, from the Gulf States, from New England, and from every other forest region of the country, to attend this year's annual meeting of the Association of State Foresters in Maryland. Twenty-four States were represented. The meeting opened on October 11 at Baltimore, and after one morning session in the Monumental City moved out into the open and spread over Maryland. In the next three days the visiting State foresters saw portions of the coastal plain, the piedmont, and the mountain section of the State. The meeting dissolved at 5 p.m. October 14, at Frederick, Md., and immediately took a bus for Washington where it reassembled as something entirely different--a Clarke-McNary conference with the U. S. Forest Service.

Two sessions, one at Baltimore and one at Annapolis, were devoted to discussion of general forestry problems such as legislation, extension of the national forests, cooperative fire protection work by the States and the Federal Government, extension forestry, forest planting, and State nurseries. A third session, at Cambridge, Md., was devoted to discussion of forest conditions on the Eastern Shore of Maryland, following a field trip through that region, and at a fourth session on October 13, at Frederick, Md., officers for the coming year were elected as follows: President, A. F. Hawes, Connecticut; vice president, C. L. Harrington, Wisconsin; secretary-treasurer, Chapin Jones, Virginia; executive committee, M. B. Pratt, California, F. W. Besley, Maryland, and the officers.

The field trips included visits to the Eastern Shore, where methods of developing loblolly pine were studied, the operation of the railroad fire line law was seen, Maryland hospitality of the traditional kind was enjoyed at the home of Mrs. William J. Starr, and the Starr arboretum and garden were looked over; to the Patapsco State Forest, the Baltimore watershed at Loch Raven, and a large hardwood operation; to a fire lookout tower built by the Western Maryland Railroad and operated jointly by Maryland and Pennsylvania; to the Febrey gardens, where experimental work is being done in grafting fruit trees on forest trees; and to the Maddox walnut plantation.

In the course of these field trips the visiting foresters were given a good opportunity to see how the forestry program, including fire protection, is being worked out in Maryland, and what is being done on State properties and in cooperative work with Maryland owners and communities.

Growing Loblolly Pine for Profit in Maryland
By J. G. Peters, U. S. Forest Service

One of the interesting demonstration areas visited by the Association of State Foresters during the annual meeting in Maryland was a 100-acre tract which was logged over for loblolly pine during the period 1919-1923. Only a few pine trees of pole size were left; the hardwoods, which were of low quality, were not cut. Shortly after the logging was completed, the present owner purchased the tract and immediately cut all the hardwoods for fuel. He left the remaining pines, which averaged about two per acre. Although the pine reproduction was practically complete before the hardwoods were cut, the pine poles were left as insurance in case of fire. Later all the remaining small hardwoods were slashed down in order to release the pine seedlings, which had come up abundantly. The hardwoods have sprouted since then, but the loblolly is fully holding its own.

This tract was purchased by the present owner primarily to round out an adjoining farm. At \$12.50 per acre, it cost \$1,250. The hardwood cut yielded 825 cords, which at \$2 stumpage brought \$1,650. The immediate profit was therefore \$400. Taxes, with an assessed value of \$5 per acre and a rate of \$1.97 per \$100, amount to \$9.85 annually. This deducted from \$24, the annual interest at 6 per cent on the profit of \$400, leaves a present annual income of \$14.15; and this without a penny invested. The owner estimates that in 25 years the pines will reach a size of 8"-12" on the stump and will yield 2,500 cords worth at least \$2 per cord, or \$5,000. This is based on the rate of one cord per acre per year, a very conservative figure, and is equivalent to saying that these 100 acres are growing at a rate of \$200 in pine timber per year.

Some will say, "Oh, well! This owner is a shrewd buyer." Surely. But don't forget that the Maryland method of cooperation and aid to forest owners sold him the practicability of forest production. He didn't have the idea when he first bought the tract.

Clarke-McNary Conference

Representatives of 24 State forestry departments met with members of the U. S. Forest Service at Washington on October 15 and 16 to discuss cooperative work under the Clarke-McNary Law. The meeting was also attended by B. F. Williamson, president of the Florida Forestry Association. This conference brought out particularly the need for more investigative work on forest fires, uniform fire statistics, and the extension of public forests. The program also included discussion of trends in national and State forestry, allotments under the Clarke-McNary Law, educational development, uniform regional fire-report forms, progress in the study of forest taxation, and the work under sections 1, 4, and 5 of the Clarke-McNary Law.

Some of the high lights of the conference follow:

A Pisgah Sight of Public Forests

(From address by W. B. Greeley, Forester, U. S. Forest Service)

Perhaps the greatest single obstacle to the rapid spread of timber growing in the United States is the unstable ownership of forest land—ownership which contemplates only temporary use of the land or temporary benefit from it. Our forest land is split up approximately as follows:

Federal Government	89,000,000	acres
States	10,500,000	"
Municipalities and counties	700,000	"
Large private owners	220,000,000	"
Small private owners	150,000,000	"

The Federal Government may be said to have adopted a stable policy of administration for the great bulk of its forest lands in Continental United States, although not for an immense area of second-rate forest land in Alaska. The State forest holdings vary from highly stabilized to wholly unstable. About 63 per cent of them, or 5,500,000 acres, is under permanent administration as State forests or State parks, while nearly 5,000,000 acres either is subject to sale or is being held with no definite policy or plan for future development. Instability of ownership and uncertainty as to future use are still characteristic of the larger private forest holdings, though a strong trend toward greater permanency of ownership and toward more productive use is evident. This trend is one of the most significant and encouraging features of the present situation.

I have great faith in the future of industrial forestry and farm forestry; but their extension will be gradual. ***Speed it up as much as we can, a great economic movement of this kind will take a long time to work itself out.

Meanwhile I feel it incumbent upon public agencies to put greater stability into our forest land situation. **** It is particularly important to extend public ownership in the classes of forest land that present the greatest difficulties and problems in profitable reforestation. I have in mind particularly the poorer forest soils with slow growth rates, areas subject to the more extreme fire hazards, and areas whose present denuded condition holds out the least prospect of restoration under private ownership. I have in mind the land-bankruptcies which are a serious factor today in many counties, where there are large areas of denuded or poor land with a future wholly uncertain under present ownership and where public forest administration would not only stabilize the forest situation but aid in general economic and social stabilization.

At the same time, by no means should public forest ownership be limited to the dregs in the pot. Expansion in this field must carry a popular appeal, not only as meeting an urgent problem in land utilization but as offering substantial public returns in the long run. Moreover, the more demonstrations we can get in all parts of the country of profitable forest management, the more will reforestation by all agencies be stimulated.

For many reasons a vigorous extension of State forest ownership is desirable. It should be designed primarily perhaps to fill in the gaps where farm forestry and industrial forestry cannot reasonably be anticipated. But it may well combine with this function the administration of areas where timber growing is of special urgency to maintain established manufacturing communities or other community interests and of areas adapted to demonstration of the best and most profitable forest management.

In broad terms, considering our forest situation in the United States and drawing upon the experience of the most progressive forest countries of Europe, I do not think it unreasonable to get one-third of the forest land in the United States under public administration. This would mean the acquisition by all public agencies of about 55 million acres more, and the extension of forest management to the 5 million acres already in State ownership but not yet under any permanent form of administration. Such ownerships should be widely distributed. There should be some of them in every State, and broadly speaking in every important forest region of every State. They should strike at the heart of the most serious idle land situations. They should serve as centers of the best sort of forestry education by demonstrating good practice adapted to our immense range of soil, climate, and forest types.

The part which the Federal Government should take in this development is to me quite clear and, I believe, is well defined by existing legislation. To the public-land forests of the West we should, as a matter of Federal housecleaning, add the 4 or 5 million acres remaining in the unreserved public domain that is chiefly valuable for growing timber.**** In the eastern States, 2,700,000 acres of national forests have been purchased, mainly under the Weeks Act. The purchase program set up when the Weeks Law was passed has been 46 per cent completed. About 3,000,000 acres more should be acquired to carry out that program with reference primarily to the protection of watersheds of navigable streams.

The Clarke-McNary Act of 1924 extended the conception of national forest purchases along the lines which I have touched upon--of stabilizing the general forest land situation and aiding the reforestation movement at the most critical points presented by large areas of denuded land. The plan we have proposed to make that feature of the law effective provides roughly for the acquisition of about 5,000,000 acres, divided equally between the cut-over regions in the Lake States and the cut-over regions in the South, with the purpose of placing the new national forests in the sections where they would have the greatest value as aids to local progress.

The cooperative principle built into the whole structure of the Clarke-McNary Act should control this feature no less than all the others. I do not want to see any national forests created under its terms in localities where they are not thoroughly welcomed by the State forest agencies or where there is not a real opportunity for the National Government to be helpful in this way in solving local forest problems and stabilizing the local forest situation.

All told, *** the acquisition of 8 or 10 million acres under the Weeks and Clarke-McNary Acts represents to me about what the Federal Government should undertake in the way of additional forest ownership.*****

This will leave the great bulk of the additional public ownership *** to State or other local undertakings. That in my judgment is entirely as it should be. I believe that the population, financial resources, industrial interests, and public sentiment in the great majority of the States, particularly in the eastern States, are able and ready to support a large expansion in State forest ownership ****. And while we should go full steam ahead in developing fire protection, forest taxation, and other encouragements to industrial and farm forestry, I doubt if there is any single item in the whole program that will give greater strength or greater public appeal or a more specific focusing point for public action than State forest ownership on a generous scale.

Furthermore, just as more public forest ownership will aid in stabilizing the general situation, equally I believe will it aid in stabilizing the forest policies and forest administration of the States. The very responsibilities and obligations assumed in the public administration of forest land will tend to give State forest organizations the stability, the technical development, and the public standing which they need to function most effectively.

Forest Fire Investigations

(From the remarks of A. F. Hawes, State Forester, Connecticut)

We are spending in New England \$500,000 a year for extinguishing fires, and I venture to say that not more than one-tenth of 1 per cent of that amount is spent for investigative work. Little is spent in investigating better methods of controlling fires. Study of weather conditions is very important. In 1925 in Connecticut we had a very bad period of six days, April 4 to 9 inclusive. In those six days occurred 26 per cent of the fires for the year, and an even greater percentage of the total area covered by fires during the year was burned over in this period. That is striking evidence of the necessity of studying weather conditions. I took

this matter up with the Weather Bureau and they reported that in the latter part of March, 1925, there was dry and windy weather. By April 4 the land was dry and the humidity low. April 7 was the worst day, humidity down to 23 per cent. On April 10 it increased to 55 per cent. Fire hazard increases rapidly as humidity decreases below this point. We should work out a table showing humidity danger by months and seasons for the different States.

Brush should be burned in the late afternoon when the wind tends to go down and the humidity increases. We found by analysis of our worst fires (over 100 acres) that 72 per cent started before 2 p. m. and 59 per cent between 10 a. m. and 2 p. m.

- - - - -

What Is Being Done in Forest Fire Investigation

(From address by S. T. Dana, U. S. Forest Service)

Fire projects are now on the programs of all the Federal forest experiment stations, and some work in this field is being done by other forestry organizations, notably the State forestry departments. Though the work so far has barely scratched the surface of the many problems in need of solution, it has gone far enough to demonstrate its value.

The fire projects under way in the Federal Forest Service cover fire damage and its appraisal, protection and suppression costs, relative hazards and liability, lightning fires and man-caused fires, rate of spread of fires, weather and fuel relationships, suppression measures, detection and patrol, hazard removal, controlled burning, firebreaks and fire lines, silvicultural practices bearing on fire protection, fire-weather predictions, and statistics.

In the Northeastern Forest Experiment Station, stress is being laid on the statistical work, and by means of punch-card tabulating machines studies are being made in detail of many factors heretofore somewhat neglected in fire statistics because of the tremendous amount of time and energy necessary to get results without this mechanical help.

Intensive field studies have been under way in the western Adirondacks for the last two years bearing on the relation between weather conditions and fire hazard. In 1925 two sets of stations were established in a cut-over hardwood and spruce forest at which detailed records were made of meteorological conditions, soil temperatures, and duff humidities. A preliminary analysis of these indicates that in that region and type precipitation exercises primary control over fire hazard. For such a season as last year the effect of one-tenth of an inch or more of precipitation usually lasts for about 36 hours. Thereafter the moisture content of the

surface duff as measured by the duff hygrometer varies very closely with the relative humidity of the air. Temperature and wind velocity are important modifying factors. During the present year this study of the relation between weather conditions and fire hazard has been extended to the spruce slope type of the eastern Adirondacks and to the white pine type in north-central Massachusetts, in cooperation with the State Foresters, Harvard Forest, the Empire State Forest Products Association, and the New York State College of Forestry. The work this summer has brought out more clearly than that of last year the influence of temperature and wind velocity, particularly in the drier and more exposed areas. In cut-over areas, in the white pine type particularly, high surface temperatures have at times apparently had more effect than relative humidity of the air in drying out the surface duff. Experiments in starting fires with matches, cigarette stubs, etc., also brought out the point that wind movement is of great importance in spreading a fire. When the air is perfectly still, litter that has ignited will frequently burn very slowly, whereas with even a slight breeze the fire very quickly spreads and gets beyond control. In dry breezy weather there was no difficulty in starting fires in white pine litter, dried fern leaves, etc., with cigarette stubs. These experiments will be continued another year with other fuels and other means of starting fires.

Meteorological studies are being carried on by the Weather Bureau in cooperation with the forest experiment stations with the object of making more accurate predictions as to the probable occurrence of the particular weather conditions found to create the most serious fire hazards.

One hundred and six lookout towers have been in operation in Michigan during 1926. During the last four seasons the State has purchased only inclosed towers, at the rate of 20 a year. It is estimated that 150 towers will be needed to put the entire fire district under close observation.

Clarke-McNary Tree Distribution to Farmers

In the summer of 1925 there were 20 State forest nurseries in the United States; in the summer of 1926, 33 States were raising forest trees for distribution to farmers for profitable utilization of waste farm land.

Twenty-nine States and Porto Rico cooperated with the Federal Government under the terms of the Clarke-McNary Law within the fiscal year 1926 in producing and distributing forest planting stock to farmers. The number of trees so distributed, the names of the leading species, and the rates charged, were as follows:

California: 1,091 Arizona cypress, eucalyptus, and other hardwoods at 10 to 50 cents each.

Colorado: 110,000.

Connecticut: 423,000 red pine, white pine, Norway and white spruce, and others at \$4.25 to \$12 a thousand.

Delaware: 10,000 tulip poplar, black locust, white oak, and black walnut - no charge.

Idaho: 82,500 black locust, willow and poplar, and others at \$1 to \$4 a thousand.

Indiana: 127,200 locust, white oak, white pine, and others at \$5 to \$10 a thousand.

Iowa: 30,217 Carolina poplar, white pine, black locust, and others - no charge except for packing and shipping.

Kansas: 27,743 Osage orange, arbor vitae, elm, and others at 5 to 50 cents per tree.

Kentucky: 12,400 chestnut oak, black walnut, and tulip poplar at $\frac{1}{2}$ to 1 cent each.

Louisiana: 89,030 slash and loblolly pine, black locust, and catalpa - no charge except for shipping.

Maine: 672,027 white and red pine at \$10 a thousand.

Maryland: 226,400 loblolly pine, red pine, Norway spruce, and others at $\frac{1}{4}$ cent to 15 cents each.

Massachusetts: 965,500 white pine, Norway spruce, and others at \$7.50 to \$10 a thousand.

Michigan: 308,625 Norway spruce, white, jack, and Scotch pine, and others at \$2 to \$16 a thousand.

Minnesota: 43,000 Norway pine, white spruce, white elm, and others at \$10 a thousand.

Nebraska: 33,925 jack pine, elm, Scotch pine, and others - no charge for jack pine, 1 to 8 cents a thousand for others.

New Hampshire: 454,746 white and red pine, white spruce, and others at \$3.50 to \$7.50 a thousand.

New Jersey: 592,000 red and Scotch pine, Norway spruce, and Douglas fir at \$4 to \$6 a thousand.

New York: 9,300,000 white pine, Norway and white spruce, and others at \$1 to \$5 a thousand.

Ohio: 1,154,694 Norway spruce, Scotch pine, black locust, and others at \$1.50 to \$8 a thousand.

Pennsylvania: 8,967,311 white, Scotch, and red pine, Norway spruce, and others - no charge except for packing.

Porto Rico: 343,164 - no charge.

Vermont: 914,500 Norway spruce, white, Scotch, and red pine, and others, at \$6.50 to \$7 a thousand.

Virginia: 44,059 loblolly, white, Scotch, and shortleaf pine and others at \$1 to \$10 a thousand.

Washington: 2,357 black locust, Norway maple, and others at 10 cents to 40 cents each.

Wisconsin: 227,175 white and Norway pine, Norway and white spruce, and others at \$4 to \$10 a thousand.

In addition to this distribution of 25,133,000 trees to farmers, the cooperating State agencies in the fiscal year 1926 distributed 13,541,000 to other planters and furnished 13,994,000 for planting on State lands. Thus their total distribution was 52,668,000. At the rate of 1,000 trees to the acre, 52,668 acres of idle land was put to work during the year through the planting of stock furnished by these agencies. This figure does not cover all plantings from State nurseries, since in a few cases State agencies other than those operating under Clarke-McNary agreements are engaged in producing stock for planting State land.

In the current fiscal year 32 States and Porto Rico and Hawaii are cooperating in the distribution of forest planting stock to farmers under the Clarke-McNary Law, the Federal appropriation for this cooperative work is \$75,000 instead of \$50,000 as in 1926, and the cooperating agencies expect to produce 79,500,000 trees ready for planting.

- - - - -

Porto Rico Forest Planting

(From the annual report of Wm. P. Kramer, Chief of the Porto Rico Forest Service, for the fiscal year 1926, with slight additional information supplied by E. Murray Bruner, U. S. Forest Service, formerly Chief of the Porto Rico Forest Service.)

The Forest Service of Porto Rico has carried on tree planting for several years, chiefly for demonstration purposes and in experiments preparatory to extensive future planting on government lands. During the fiscal year 1926, 63,486 tree seedlings of various species were planted on insular forest lands, and on the Maricao Insular Forest 5,262 pounds of forest tree seeds were sown. Direct seeding in this and other instances has been highly successful, and it is to be conducted hereafter on a larger scale each year.

The Rio Piedras Forest Tree Nursery, established in 1919 as a plot of 2.4 acres, now covers 11 acres and has 299 concrete seed beds and 8 permanent buildings. In the past fiscal year it produced 434,766 seedlings. This fell short of the preceding year's output by 100,000; a severe drought lasting from December to July had so reduced the water supply that germination was poor and the transplanting work was seriously handicapped. Of the 1926 crop 27,200 seedlings went to corporations, 46,487 to agricultural agents, and 296,677 to private individuals. The distribution to individual landowners exceeded that of last year by more than 90 per cent. Not half of the demand could be met.

No less than 50 different species are being raised in this government nursery, including many exotics. The bulk of the output, however, is of the following species:

Calophyllum calaba, or maria
Casuarina equisetifolia, or beefwood
Coffea San Ramon, or San Ramon coffee
Cordia gerascanthus, or capa prieto
Dalbergia sissoo, or sissoo-wood
Eucalyptus sp.
Ligustrum emurense, or Amoor river privet
Mangifera indica, or mango
Petitia domingensis, or capa blanco
Pinus, or yellow pine
Spathodias campanulata, or African tulip tree
Swietenia mahogani, or mahogany
Schimus terebinthifolius, or Brazilian pepper tree
Thuya orientalis, or Chinese arbor vitae

A notable improvement at the nursery during the last year was the construction of a lath transplant screen, primarily for eucalyptus seedlings. It is 60 by 168 feet and has 27 transplant beds each 55 feet long by 4 feet wide, and will accommodate about 25,000 seedlings.

An experimental planting of chaulmoogra (*Taraktogenus Kurzii*), the tree from whose seeds is derived an oil used in the treatment of leprosy, was made in January, 1926, in the grounds of the new leper colony at Trujillo Alto. This Asiatic tree was never before tried out in Porto Rico. The plantation, which includes 400 trees, appears to be thriving. Several hundred more of the shipment of this species furnished by the U. S. Bureau of Plant Industry remain in the nursery and will be planted during the coming year. If these plantings succeed it will be possible to produce in a laboratory established directly at the leper colony the chaulmoogra oil needed in treating the patients.

Several species of *Cinchona*, the tree from whose bark quinine is derived, are being experimented with by the insular forest service on behalf of an American firm manufacturing pharmaceutical products. The seedlings are growing thriftily in the nursery. If they continue to do so after being transplanted to denuded lands within the insular forests, this company intends to buy an extensive tract of mountain land in Porto Rico for the purpose of cultivating *Cinchona*.

The "forest trust fund" of Porto Rico, derived from the sale of products of the insular forests, had an unexpended balance on June 30, 1926, of more than \$11,000. During the present fiscal year it is planned to draw moneys from this fund for the establishment of subnurseries, the construction of trails in insular forests, and the production of a motion picture on the subject of reforestation.

Lookout towers having outside ladders are being treated by the Minnesota Forest Service as follows: a U-shaped steel bow with a clamp at each end is fastened to each of the horizontal girts behind the ladder and upon these bows strips of woven wire are fastened so that the ladder is climbed within an inclosure. This takes away any nervous fear of falling backward and makes the towers usable for many who otherwise could not climb them. Even for experienced climbers the device has value on cold stormy days when the ladders are slippery and fingers are stiff.

Portable sawmills registered for operation in New Hampshire in the first eight months of 1926 numbered 215. From April 15, 1925, the date of the approval of the law requiring that mills be registered by the State forestry department before they are operated in any year, to September, 1926, the department issued 540 such permits.

Fire Protection Funds Needed in Connecticut

Three times the amount that Connecticut is spending to protect its forests from fire would be needed to give them adequate protection, except in years of unusually heavy rainfall, State Forester A. F. Hawes declared before a meeting of the Connecticut Forestry Association on October 2. The State now spends \$15,000 a year on this work. The greatest needs, Mr. Hawes said, are for more lookout towers, more motorcycle patrolmen, and more gasoline pumps. He added that increased appropriations are needed for building forest roads and trails and for thinnings and plantings, and expressed the hope that the legislature at its next session will appropriate not less than \$200,000 for buying land for State forests.

- - - - -

Vermont Plantings Increase

In 20 years the Government and people of Vermont have planted 13,010,014 forest trees. Beginning with 35,000 in 1907, annual forest plantings in the State rapidly increased to 567,700 in 1910 and to 1,046,600 in 1913. During and shortly after the war plantings were carried on at a much reduced rate, but in 1925 they again passed the million mark and in 1926 they stopped at 1,778,785 only because the State nursery supplies for the year were exhausted. The forestry department on the basis of this spring's sowing hopes to have 5,000,000 transplants ready for distribution in 1929, and will ask the next legislature to provide additional nursery land.

Municipal forests have now been established by 33 cities, towns, and villages of Vermont, and on these 1,272,400 trees have been planted.

- - - - -

Putting in Fire Lines in Michigan

The State of Michigan is experimenting with fire-line construction in and around State game refuges, following the general plan which it has used in the State forests for several years. Ten tractors and the same number of disc units have been purchased and are at work in almost as many localities. Lines are cleared to a width of 14 feet. Stumps up to 4 or 5 inches diameter are pulled with the tractors, and larger stumps are broken up with explosives. When cleared the lines are ploughed to a width of 12 feet. They will be gone over with a disc at least twice a year to keep down vegetation. The construction cost will probably range between \$75 and \$150 a mile, and the annual maintenance cost should be less than \$5 a mile. It is expected that from 200 to 300 miles will be constructed during 1926.

Blister rust control measures have been completed in 56 towns of New Hampshire and are being carried on in 19. In September, there remained 6 in which the eradication of currant and gooseberry bushes had not been started. The total area covered in the 56 towns was 108,835 acres.

- - - - -

County Forest Tree Nursery

Orange County, Calif., in order to reforest its watersheds is establishing a forest tree nursery. The nursery is to be located at Orange County Park, a recreation area of great beauty 6 miles from Santa Ana, which has soil of good quality and a plentiful water supply. An area near the park picnic ground has been prepared for seedbeds and transplant rows, which will thus be well placed to attract the attention of park visitors. Park Manager Norcross, who has raised many of the fine trees now lining the highways of the county, will have immediate charge of the nursery. Seed and some seedling trees for planting this fall will be furnished by the Agricultural Extension Service, and Extension Forester Woodbridge Metcalf will from time to time assist in the county project with technical advice.

J. K. Munhall, an orange grower, has been the moving spirit in this project, which has been heartily supported by the Orange County Farm Bureau.

- - - - -

Los Angeles County, Calif., is spending more than \$500,000 on forestry this year, principally in fire protection. One of its protective measures is to burn off safety strips along the foothill roads. The risk is usually in dry grass among scattered rocks. A truck is equipped for this work and a party of men are kept busy at it throughout the early summer.

The county has voted a bond issue of \$40,000,000 for flood-control work.

- - - - -

The Forestry Council of Chautauqua County, N. Y., composed of representatives of 51 county organizations, was formed at a meeting at Fredonia on September 23. Hawley B. Rogers, Agricultural Agent of the Erie Railroad, was elected president. Each organization represented in the membership is pledged to make forestry the topic of at least one meeting and to campaign actively for reforestation. In the spring four planting

demonstrations will be held in different parts of the county to prepare members of the council for planting trees themselves and for instructing others in planting. Next summer the council will make a tour of plantations in the county and with help from Cornell University will prepare an exhibit for the county fair.

About 250,000 forest trees were planted in Chautauqua County this spring. The county council hopes next spring to double this planting.

Quotation from a Bulletin of the Pine Institute of America

Headline News

In Alabama, the first half of 1926, more than a million acres of forest land were burned over. The direct money damage alone was over a million dollars. A big tax!

Bigger News

Where organized to fight forest fires the savings were 20 per cent. This saving amounted to \$277,525 in six months and the fire fighting cost only \$1,866! DIVIDENDS OF FIFTEEN THOUSAND PER CENT IN SIX MONTHS.

Where the Fire Tax is Collected

The tax of the Fire Demon is always collected from the county where the fire burns. Tax reduction begins in the same county. It needs organization to do it.

An experiment in forest planting by airplane has been made by the Hawaiian Territorial Board of Agriculture and Forestry, on a burned-over tract of several square miles where planting by the usual methods was impracticable because of the extreme roughness of the terrain. The planting from the air was accomplished through the cooperation of the Army Air Corps. Conditions were exceptionally favorable for the sowing, because a rain preceded and accompanied the seed distribution and the burned area was covered with a light growth of grass.

EDUCATION AND EXTENSION

The Apprentice Forester

By Ward Shepard, U. S. Forest Service

After leaving forest school the young forester must, like the young engineer or doctor or lawyer, undergo a period of apprenticeship. He becomes a sort of interne in forestry. It will be a pity if he approaches this period with reluctance or with any false ideas that the lowest rung of the ladder, is, so to speak, beneath him.

A forester or lawyer or doctor just out of school isn't a finished product--in fact he is hardly yet entitled even to call himself forester, lawyer, or doctor. His education is just fairly started, and ahead of him is a long and sometimes gruelling grind in the craftsmanship of his work. Just as the hospital interne gets his start on the minor work of a hospital and the minor operations of surgery, just as the apprentice engineer spends weary hours over the drafting board or computing cuts and fills or checking deliveries of material, so the apprentice forester finds his real opportunity in the groundwork of forest protection and development. Many forest school graduates elect to spend their apprenticeship in the Forest Service, so that the national forests have a direct educational relation to the forest schools.

If the young forester takes a job too big for him to swing--a job that needs an older, more experienced man--the result may be bad not only for himself but for the profession and the cause. Moreover no man can get a real grasp of his trade without working long and arduously in the raw materials of that trade--in our case, to name a few of them, trees, soils, rocks, roads, towers, incendiaries, sawmills, fires, horseshoes, bridge stringers, cattle brands, J. P. courts, drift bolts--and above all, the marking ax.

The Forest Service, with the concurrence of the forest schools, has in the past year or two developed the plan of appointing junior foresters as rangers, usually at the start to assist experienced district rangers. Some young foresters are prejudiced against doing what they regard as the lowly tasks of the ranger. As a matter of fact, the opportunities for creative workmanship on the average ranger district of 100,000 to 200,000 acres are far beyond the capacities of the average young and inexperienced forester; in truth, they are a challenge to men of exceptional experience, intelligence, and imagination. The ranger job in the Forest Service is as big as a man makes it and he gets out of it what he puts into it. Moreover, the hard physical work that necessarily goes

with a real grasp on the ranger job is a good test of a man's moral and physical fitness and a measure of his emancipation from the steam-ediator, swivel-chair aspect of modern civilization. It is no job for a man who prefers the soft to the real. It is a succession of those hard, refractory tasks that are the root and essence of conservation in the woods as distinguished from conservation through the microphone.

The Forest Service is developing the policy of making the beginning ranger job a more consciously directed constructive experience, in which the young forester will get varied practice in silviculture, protection, improvement, grazing, administration, and other branches of work.

The service is likewise strengthening its formal educational tools - particularly the short-term training camp, where the newer men are broken in to service work or where more experienced men are broadened in their forestry experience. Above all, the rapid development of big-sale forest management on a practical basis in the national forests gives the best possible training ground to equip men with the vision and technique to tackle successfully the analogous problem of industrial forestry - conversion of unmanaged forests to sustained yield.

The forestry of the future - it is already visible - is going to be genuine woods craftsmanship, and mostly on a big scale. The place to learn it is in the woods. As yet the national forests afford the chief opportunity to get this big-scale craftsmanship. Just as hospitals not only do their daily task but supplement the medical schools in training physicians, so the function of the Forest Service is not only to do its daily task but to supplement the forest schools in training skilled foresters.

Forestry Students in the United States

The present enrollment of forestry students in the forest schools of the United States, according to a recent survey by E. N. Manns of the U. S. Forest Service, is about 1,800. A very much larger group, distinct from this, are studying forestry but not majoring in it. Many of the latter are freshmen, so it is reasonable to suppose that among them are some future foresters. The men who expect to receive forestry degrees in June, 1927, number about 230.

In 1912 it was estimated that there were about 500 technically trained foresters in the United States. In 1926, the number is estimated at between 3,000 and 4,000.

Harmony Conference Between Schools and Laboratory

Twelve universities, colleges, and forest schools sent representatives to Madison, Wis., for a conference during the week of August 30 at the U. S. Forest Products Laboratory. This was the second annual meeting there for the purpose of harmonizing the forest products research of the laboratory and that of the various schools and of promoting the exchange of information between these agencies. The general subject of talks and discussions was methods employed by industry to use and prevent wood waste.

Yale Forest at Keene Enlarged

The Yale Demonstration and Research Forest, at Keene, N. H., was enlarged this summer to nearly 1,300 acres. A new fund for demonstration purposes, also, has now made possible the maintenance during the summer of a resident forester, whose chief duty is to assist Professor Toumey in showing visitors about the forest and explaining the aims of the work being carried on. New signs were set up along the Winchester Road at the ends of the forest property and at the Headquarters camp to attract passing motorists and invite them to stop and see forestry in practice. The result was 200 visitors in less than three months, exclusive of the 100 people who attended the annual Field Day on September 4.

The forest is nearly all stocked with red and white pine stands in various age classes up to 60 years. Intensive silviculture is practiced in the establishment, regeneration, liberation, and harvesting of the pine stands. Almost all the cutting operations are being carried out at a profit, owing to the excellent market in Keene.

In order to make all parts of the forest accessible, 17 miles of road have been built within it. This road system makes possible the profitable utilization of cordwood and even single large pine trees no matter where they are located on the property.

For demonstration purposes six routes of about two miles each have been laid out along the roads. Nearly 100 small signs, numbered serially, have been placed at various points on these routes, each number referring to a paragraph in a mimeographed text which describes past operations, their costs and purposes, and operations planned for the future.

Four hundred firms and individuals of Seattle and Tacoma, Wash., are stamping the slogan "Help Prevent Forest Fires—It Pays" on their letters and bills. This is the result of the personal efforts of Victor Beckman of Seattle.

Forestry Schools in Iowa Summer Camps

By I. T. Bode, Extension Forester, Iowa State College of Agriculture

What trees are common in the woodlands of Iowa, and what are their characteristics? What kind of wood makes the best "shinny-stick"? How can you cook beefsteak over a fire without a frying pan and without smoking your eyes out? How old is that tree? What are "outdoors good manners"? How can you use woodlands? What are they worth to the farm?

Boys and girls in Iowa are learning to answer questions like these, through forestry schools conducted in summer camps. From 2 schools in the summer of 1923 to 25 schools in the summer of 1926 is the record of growth made in this work. This year's schools enrolled 1,400 boys and girls and more than 100 adult leaders from Clinton, Dallas, Polk, Marshall, Franklin, Muscatine, Wapello, Pottawattamie, Plymouth, Sioux, Black Hawk, and Warren Counties.

These schools are being conducted by the Iowa Forestry Extension Service, in cooperation with the farm bureaus, Boy Scouts, Y.M.C.A., 4-H clubs, and other similar organizations. Not a small part of the work is being done in 4-H club girls' camps, and the girls take so much interest in the work and do it so well that they are giving the boys a "run for their money."

The work consists of a series of four lessons, usually given in a period of two days and fitting in with other camp activities. The classes go hiking, and are taught in the woods. Lesson one takes up the identification of common trees of the locality, usually in the immediate vicinity of camp. Lesson two deals with the use of some of the species, both in the woods and outside, and with caring for oneself when using the woods for recreation or for other purposes. Lesson three continues with the subjects of Lesson two and takes up in addition the building of camp fires and the need for care with fire in the woods. Lesson four treats of forest influences, such as the dependence of wild life upon the woods for its existence, the effect of forests upon streamflow and ground water, and the economic importance of forests to the nation.

The lessons are planned progressively, so that those who have had the first studies can take up more advanced work the following year.

The boys and girls alike have surprised the instructors with their interest in the lessons, especially in the more technical phases, and with the way in which they have made use of the new information in club activities during the remainder of the year.

A Year of Forestry for Camp Fire Girls

Forest green is the dominant color in the picture of Camp Fire Girl activities planned for the coming year. For the 150,000 young girls organized under the symbol of the camp fire, 1927 is to be "Tree Year." Their program includes practical work in planting and caring for trees, studying the forest and helping to protect and preserve it, and spreading the gospel of fire protection, good woods manners, and proper use of forest resources.

This program for a Tree Year is not a scheme newly born in the brain of an organizer; the girls have been preparing for this big project and have already learned much about tree planting and tree care. This year the Camp Fire Girls of Grand Rapids, Mich., under the direction of Frank L. Dumond, curator of education at the Kent Scientific Museum, and Lucien Palmer, county forester, planted 6,000 trees on their camp site and 10,000 along the Muskegon River, and Cleveland, Ohio, Camp Fire Girls planted 500 trees on their camp site.

Tentative plans for Tree Year cover planting on camp grounds, school lands, State and municipal forest land, and other lands; Christmas tree planting; memorial tree planting; tree seed collecting; establishing seed beds and tree nurseries on a small scale; tree census and tree mapping in parks and streets; nature trails; fire prevention; eradication of insect enemies of trees; protection of wild life and native plants; studies of forests and forestry; and active participation in American Forest Week.

Eight groups of boys and girls of as many counties of California were visited at their camps this summer by Prof. Woodbridge Metcalf, extension forester. Professor Metcalf discussed simple forestry principles with the 350 children and conducted them on hikes for identification of trees and shrubs.

The article on Native Forest Trees contributed to the 1916 edition of the Boy Scouts Handbook by George B. Sudworth of the U. S. Forest Service has been considerably enlarged by him for the edition now being prepared. To the original article dealing with some 80 native species he has added a tabulation of the trees to be found in each of the four geographic regions of the United States.

New York County Work in Forestry

Nearly every citizen of New York State is now within easy reach of an area chosen by the Agricultural Extension Service for the purpose of demonstrating reforestation. In almost every county of the State much of the preliminary work has been done on a forestry program. Within three or four years the areas chosen will have developed into real demonstrations of forestry practice. The extension service at Ithaca tells the county agents that each of the three lines of county work—agriculture, homemaking, and junior extension—needs "a careful plan for tomorrow, a charted plan for the year, and a plan on paper for the next 10 years"; but that county work in forestry demands a program looking forward from 50 to 100 years.

- - - - -

Educational Forestry Tour in New York

A party of 55 including representatives of New York State farm bureaus, boards of supervisors, chambers of commerce, and railroads, as well as foresters, forest pathologists, and others, in September were led by Superintendent of State Forests Pettis on a four-day tour through the Adirondacks and northeastern New York to study reforestation. Starting from the New York State Conservation Commission's nursery at Saratoga they visited State, county, city, and privately owned forests, from 1 to 26 years old, and studied many phases of reforestation work ranging from the care of seedlings in the nursery to the development of such a plantation as the 1,500-acre municipal forest of Glens Falls.

Two junior members of the survey party were Earl Hock and Milton Bookstaver, whose forest plantings on their fathers' farms had been adjudged the best reforestation work done this season by boys' club members in Orange County. The Middletown, Port Jervis, and Walden, N. Y., fish and game clubs had contributed \$25 apiece to the prize fund, and the boys were allowed to choose between receiving cash prizes and joining the forestry tour. A third club boy of Orange County, Charles DuBois, joined the tour at his father's expense.

- - - - -

At the Champaign Valley Exposition held at Essex Junction, Vt., August 31-September 4, individual and club prizes were awarded for forestry work of children in 4-H clubs. Individual premiums were for the best collections of Vermont woods mounted and labeled; hypsometers, calipers, and Biltmore sticks made by club members; and leaf collections. First, second, and third prizes were allotted to clubs showing the most progress during the year.

- - - - -

Forestry Extension in Ohio

A busy summer is reported by F. W. Dean, extension forester of Ohio. Forest planting projects were started in Clermont, Ashtabula, Portage, Morgan, and Jefferson Counties. In Seneca and Hancock Counties, with the cooperation of L. J. Leffelmar of the Ohio Department of Forestry, definite projects were started in protecting farm woods from grazing. In Clermont County a field meeting for farm people was held at the 12-year-old forest plantations of the county experiment farm. In Athens County a field day for extension workers of southeastern Ohio was held at the Waterloo State Forest, which contains a flourishing plantation of about 150 acres of various species of pine and hardwoods, established 10 years ago.

A forestry exhibit prepared by Mr. Dean attracted much attention at this year's Ohio State Fair. Within a 9 by 12 foot space rows of 2-year seedlings of white pine, red pine, Scotch pine, Corsican pine, and Norway spruce were lined out to represent a farm nursery. A contrast in size was afforded by a row of 4-year-old transplants. On the wall hung a large base map of Ohio showing by counties the number and distribution of the trees that have been sent out by the State department of forestry. Adjoining the map were five large photographic panels showing in successive steps the right way to set out a 2-year seedling. In another exhibit at this fair prepared by Mr. Dean in cooperation with the State experiment station, small trees of the species and sizes distributed from the State forest nursery as planting stock were mounted on cloth so as to show plainly the top and root systems. Contrasted with these were trees of Corsican, white, and red pine planted 10 years ago at the forest experiment station. These young trees, the tallest of which was about 22 feet in height, were to demonstrate that it is not necessary to "wait a lifetime" for planted trees to attain appreciable size.

Razorback Featured at Mississippi's First State Fair Forestry Exhibit

The Mississippi State Fair at Jackson this year had its first forestry exhibit, installed by the new State Forestry Commission. One of the features of the exhibit was a model in which, according to press reports, "the razorback appeared in his customary role of destroyer of longleaf and slash pine seedlings, and he looked poor enough and mean enough to be at the root of much trouble." Fire protection, timber growing, utilization, erosion, and all the other forestry regulars were also on parade in new, local-color uniforms calculated to catch the eye of good Mississippians.

A model showing the effects of deforestation on water supplies and water-dependent industries has been exhibited this year at State and county fairs by the California College of Agriculture. Water actually flows through the model, which was prepared under the direction of Professor Metcalf. On one side the water from forested hills is shown furnishing electric power, irrigating farm lands, and flowing to metropolitan centers. The other half shows the same mountain slopes deforested, the power plant and irrigation work abandoned, and orchards and farms buried under masses of material carried by torrential waters from the unprotected slopes.

- - - - -

The evangelizing of automobile service stations was a part of the educational program adopted this summer by the Northern California Forest Fire Prevention Association, recently organized by the Chambers of Commerce and Lions Clubs of Dunsmuir, Yreka, and Mount Shasta, the Siskiyou Sportsmen's Association, and officers of the Klamath and Shasta National Forests. Every service station man from Redding north was to be personally interviewed and asked to warn travelers of the local fire danger and advise them to observe the greatest care in using camp fires and smoking materials.

- - - - -

FOREST SERVICE NOTES

Fire Control Research

By Earle H. Clapp, U. S. Forest Service

(From a memorandum to the Forester based on an inspection of certain fires in the western national forests in the summer of 1926)

Fire suppression costs to the Forest Service in the three western districts this year will probably approximate \$2,000,000. States, associations, and private owners have expended large additional sums, and to such costs must be added damage in virgin stands, the destruction of young growth, the delay in bringing forest lands into production, the disruption of productive work, etc.

For the Northern District, as well as for the California and Pacific Northwest Districts, 1926 is not a decidedly exceptional year. Fire-fighting costs in the Northern District exceeded \$2,000,000 in 1919; \$500,000 in 1910, 1917, and 1920; and \$350,000 in 1914, 1918, and 1925.

The long series of bad years with excessive costs and losses raises a serious question whether thoroughly effective fire protection can ever be obtained, even with excessive costs, by administrative activities alone. I am convinced that it can not. Without research, control will in many critical respects remain what, in general, it is now, a primitive rule-of-thumb process, based upon opinion, and on large-scale trial and error. The lack of satisfactory progress goes back to a lack of fundamental knowledge, among other things. For the building up of this fundamental knowledge we are now making very small provision.

By no means least among the measures for dominating the fire situation should be adequate provision for acquiring knowledge of all phases of the problem, provision for a research staff on which we can depend for systematic yearlong efforts to acquire a scientific basis for both protection and suppression.

The need for forest fire research will be made more apparent by a brief consideration of the classes of problems that ought to be studied intensively.

Causes: Lightning stands out among the causes of serious fires during the present season. On the Kaniksu Forest a single early July storm set 65 fires and another a few days later started at least 200. In the Northern District lightning was responsible for 61 per cent of

all forest fires in 1915; 75 per cent in 1920; 66 per cent in 1923; 80 per cent in 1925; 75 per cent in 1926 to date; and an average since 1910 of 43 per cent. Lightning has been responsible for many serious fire emergencies. So little is known about lightning storms that the Weather Bureau made no prediction of the one that set 200 fires on the Kaniksu and issued a warning only on the morning of July 6 of one that began on the previous afternoon and set 65 fires. If lightning has been responsible in 1926 for a good share of the fires in the Northern District and elsewhere in the West, which for all organizations and ownerships have resulted in cost and damages of several million dollars, would it not be logical and economical to assign at least part of the time of one man at each of the forest experiment stations in our three critical western districts to getting and analyzing data necessary for studies of the formation, movement, and behavior of lightning storms and for both general and localized predictions?

Lightning, however, is only one of many causes. I believe that systematic studies should be made of all the more important causes of forest fires.

Fireproofing: Wide differences of opinion with exceedingly slender basis in experience or fact now exist on the effectiveness of firebreaks, the necessity for snag felling in timber sales along railroad rights of way and highways, etc. Although we know that a large number of our most serious fires originate in slashings, there are many unanswered questions regarding slash disposal and its relation to fires; whether it should be piled and burned, left as it falls, or cut into blocks, etc. Our silvicultural systems may in some regions at least have a decisive bearing upon prevention and suppression, but we have only the vaguest kind of knowledge regarding this. The possibility of fireproofing offers, therefore, a large series of problems on which, sooner or later, we shall have to have much more accurate knowledge.

Hazard Rating: The effectiveness of fire control could undoubtedly be greatly increased if the distribution of prevention and potential suppression forces could be based upon an intelligent rating of fire hazard and liability. I believe that we ought to look to research for the development within each region of the principles underlying such a rating, which could then be used in carrying out administrative surveys.

Combustion: Forest fire research has shown the relation of relative humidity to the combustion of forest materials. This relationship seems to be particularly important in the Pacific Northwest. In other regions some of our men believe that wind should be taken much more largely into account. So far, however, we know only in a general way how to take advantage of relative humidity in fire suppression, even in the Pacific Northwest, and we have only a vague knowledge of the other factors influencing combustion, such as wind, topography, and the character, quantity,

distribution, and condition of the fuels. Of more obscure factors some of which may be exceedingly important, we know nothing. Simpson of the Pacific Northwestern Forest Experiment Station has preliminary data indicating that relative humidity is higher in the forest than in the open in the spring and early summer, but lower in the late summer and fall. If authenticated, think of what such an isolated discovery would mean in suppression tactics such as backfiring. What we need is an understanding of these exceedingly variable factors as they influence combustion in actual fires. We shall have to supplement investigations of going fires with controlled laboratory experiments to determine the laws of combustion of forest fuels. Such laboratory and field studies of combustion and going fires ought to contribute to the basis for hazard and liability rating of forest areas and also to the determination of the most effective tactics for fire suppression.

Brush-burning fires, at least in such regions as the Northwest and the Inland Empire, should be studied along with other fires.

Tactics: Year after year poor tactics are responsible for large fires and excessive costs and losses. In the Northern District during the current season many old conceptions of good suppression tactics went by the board - why, even the most experienced fire fighters are not able to explain to their own satisfaction or to agree. It is for such reasons as this that I doubt if satisfactory suppression technique, tactics, and strategy can ever be worked out through the rule-of-thumb system. Each man now bases his tactics very largely or entirely on his own experience, and we have no satisfactory science of tactics and strategy to serve as a basis for instruction and training. We may have fairly good technique for directing a handful of fire fighters, but we have very poor technique for using large crews. If we are to dominate the fire situation, we must have a knowledge of technique so definite that it can be widely disseminated, and this knowledge can not be acquired except by scientific investigation.

The whole situation is comparable to warfare. The study of strategy enters very largely into the training of soldiers. Principles are developed through years of intensive study of classical battles on maps and on the ground. In the long run shall we not have to come to the plan of having a group of exceptionally qualified men devote their full time to the study of fire tactics alone, basing their work upon a scientific understanding of the combustion of forest fuels and upon the use of existing and improved equipment?

Equipment: The practically exclusive use of man power in fire suppression is one important reason for its excessive cost. Is not the possibility of replacing man power by machines sufficiently promising to warrant intensive systematic investigation? Power pumps have been coming into use during the last few years; but experienced fire fighters have radical differences of opinion regarding their effectiveness,

undoubtedly because of the limited number of cases in their own experience. Men who have used pumps successfully think that they could be improved. Why not make someone responsible for seeing that the good ideas of a large group of administrative men are brought together, correlated, supplemented where necessary, and presented effectively to the pump manufacturers? Tractors have been tried out successfully under some conditions. Is it not possible that their use can be rather widely extended? A very small use has been made of plows. Has it gone as far as it could and should? Are our plows of the right type for the very specialized conditions under which they must be used in fire suppression? Is it not possible to find much more effective means of communication? There were men on serious fires during the current season who never received Weather Bureau predictions or the results of airplane observations. It ought at least to be possible to develop portable radio receiving sets to relieve our dependence on telephones. Undoubtedly, investigations of combustion will result in the development of equipment that will enable men on the fire line to determine accurately the combustion factors which they ought to take into account.

Damages: We are now able to make only the most general estimates of the physical damage caused by fires. We can not even estimate satisfactorily the damage to standing timber. In many cases we do not know authoritatively how rapidly fire-killed timber will deteriorate, information essential for intelligent salvage. Beyond this are the damages to soil in reduced fertility, increased erosion, etc. A more concrete appreciation of physical damage should underlie the rating of hazard and liability. It would enable us to direct all protective efforts more intelligently. It should enable us to present fire trespass cases much more effectively to the courts. It should give a better basis for general public education.

Statistical and Other Investigations: The use of statistics will be necessary in most of the classes of fire research just listed. Possibly some statistical investigations will be needed outside of the classes mentioned.

Several of the subjects for research listed such as causes, laws of combustion, tactics, are important enough in themselves to justify full time of one or even two men at each of the California, Pacific Northwest, and Northern Rocky Mountain Forest Experiment Stations. Many of the rest ought to have at least a substantial part of the time of one man at each station. Exclusive of investigations of equipment, the fire situation fully warrants an increase in the investigative staff of each of these three stations by from five to seven men. We ought to have, particularly, able men with some experience. With a supplemental clerical force, with reasonable provision for temporary field assistants, equipment, quarters, etc., allotments to stations should range from \$25,000 to \$40,000, totaling at least \$100,000 a year.

Investigations of equipment should probably be organized in one forest experiment station or district instead of three. I should like to see it at a station because of the greater possibility of uninterrupted work. We ought to have a staff of from two to three men, with ample allowances for travel and the trying out of special equipment. An allotment of \$15,000 a year could be used very effectively, and even this amount would be too small unless we could depend upon private manufacturers for very large assistance.

These estimates should be supplemented by provision for intensive laboratory investigations of combustion, which could best be centered at Madison. At least \$10,000 a year would be required for this purpose.

A total of \$125,000 made up as suggested is, I believe, fully justified by the critical fire situation which seems to obtain year after year in the three western districts. This total is very small when compared with fire-fighting costs and fire losses, with delayed progress in the development of forestry, and with the effect which a repetition of heavy fire losses has on the opinion of foresters and of lumbermen as to the feasibility of practicing forestry. If we are going to have forestry in these regions we must have fire protection. I don't believe that efficient protection is possible without a brand of knowledge wholly different from anything which we have now or which men burdened with administrative duties, whatever their ability or intentions, can ever hope to obtain.

- - - - -

Alaskan Forest Surveyed from the Air

Aviators and photographers of the Navy this summer made a large and very successful beginning in an aerial survey of the Tongass National Forest, Alaska, in which the Geological Survey and the Forest Service cooperated. Beginning early in June in the Ketchikan region, in not much more than three months' work with two planes they photographed about 6,000,000 acres, including almost all the islands and a portion of the mainland between Dixon Entrance and Chatham Strait. Such progress in work that requires absolutely cloudless weather was accomplished under Alaskan climatic conditions only by spending extremely long periods in the air on each favorable day.

Lieut. Ben H. Wyatt of the Navy was chief of the surveying party, which included P. A. McDonough, chief photographer of the Navy Air Service. R. H. Sargent represented the Geological Survey.

The mapping was done from parallel lines of flight 4 miles apart and at an elevation of 10,000 feet, with an island or group of islands as the working unit. These lines were placed on navigating charts for field use and the pilots used the chart and compass to take and follow the course just as in sea navigation. The camera used has three lenses, one facing directly downward and the others facing to the right and left of the flight line at an angle of 45 degrees. The size of each picture is about 6" by 6". About 350 square miles was photographed in an hour's flight.

As an illustration of the value of the survey in disclosing water-power resources District Forester Chas. H. Flory mentions four water-power sites on Revillagigedo Island (Ketchikan Island). Individually these are too small to furnish power for large paper mills, and because of the rough topography of the center of the island forest officers had supposed that transmission lines to join them would have to be long and circuitous. Now the aerial survey reveals a number of passes that will provide excellent routes for transmission lines, so that all power from the four sites can very readily be combined at one of them or at Ketchikan. In addition, the survey has disclosed two previously unknown sites on this island that can readily be tied in to the others. With these discoveries the possibilities for the paper-making industry at Ketchikan have assumed an entirely new complexion.

Maps prepared from the aerial photographs will make it possible to determine the areas of watersheds, information which could not be obtained from ground surveys because of the excessive cost and in some cases because of the physical impracticability of scaling high, snow-capped ranges. Mr. Flory foresees that the maps will be of great value in the preliminary reconnaissance of pulp-timber forests, ⁱⁿ timber-sale administration, and in the selection of routes for roads and trails. Finally, since the pictures show not only uncharted coast lines but shoal waters and submerged reefs and rocks, they will be helpful in inshore navigation.

In addition to the regular vertical mapping photographs taken from 10,000 feet elevation, the surveying party took approximately 200 7"x9" obliques from a lower elevation to show important features in more detail.

The portions of the Tongass Forest that remain to be photographed include the Baranof, Chichagof, and Kuiu Islands, the area north of Icy Straits, the portion of the mainland lying between Sumdum and Thomas Bay, and the Bradfield Canal Country. These and probably more could be covered in one field season. The completed survey, Mr. Flory says, would make available more information concerning the resources of the Tongass than forest officers would be likely to acquire in 20 years' ground work. He adds that the time was ripe for this exploration from the air because pulp and paper manufacturers have just started engineers into the forest to study timber and water-power resources, and nothing could more effectively stimulate the development there of this industry.

This was the Navy's first experiment in aerial survey work in Alaska. The Forest Service and the Geological Survey hope the Navy will find it possible to continue the work in the coming field season and cover the remainder of the forest.

Headquarters of New Experiment Station at Berkeley, Calif.

Berkeley, Calif., has been chosen as the headquarters of the California Forest Experiment Station. This choice is primarily due to the location at Berkeley of the California Agricultural College and Agricultural Experiment Station, which form a part of the University of California. Many of their investigations have a bearing on the production of timber crops. The new station will have an excellent opportunity to cooperate with the Forest School of the University of California and to disseminate the results of its research through the California Extension Service. Berkeley will be an advantageous location also because it is centrally situated and permits ready access to all the forest regions of the State.

Branch Field Station Opened in Michigan

The Upper Peninsula Substation of the Lake States Experiment Station was formally opened September 8 at Rusc, Mich., on 320 acres of land presented to the Government by the Cleveland-Cliffs Iron Co. In the presence of a large gathering of forestry officials, forestry educators, and others, John M. Bush, land agent of the Cleveland-Cliffs Co., placed the deed to the land in the hands of Forester W. B. Greeley. After an address of welcome by George Bishop, secretary of the Upper Peninsula Development Bureau, the Forester marked with the ax the first tree in the tract chosen for cutting.

Every Lookout a Weather Observer

Branch meteorological stations were established this summer at the fire lookout stations in the national forests of California. Each forest lookout was made an observer, charged with the duty of sending daily reports to the Weather Bureau office at San Francisco on wind, humidity, state of weather, and storms. The information was telephoned to the nearest telegraph office for transmission.

The Weather Bureau made forecasts daily in the dry months when forest fires prevail, and twice daily during periods of special hazard. These forecasts were transmitted to forest officers by the Forest Service headquarters in San Francisco. Special data for the redwood region were furnished by the Eureka Weather Bureau Station.

Leslie Gray of the Weather Bureau had charge of the establishing of the branch meteorological stations on the forests.

This work will probably be continued next year, with the same general procedure.

National Forest Roads and Trails

In the fiscal year 1926, national forest roads and trails cost the Federal Government \$11,733,804 and cooperating States and counties \$127,756. With these funds 1,950 miles of roads and 4,694 miles of trails were constructed and improved, and 11,965 miles of roads and 44,919 miles of trails were maintained. On July 1, 1926, the total expenditure on roads and trails on the national forests since the forests were established stood at \$68,720,475, of which amount \$14,418,962 was contributed by State and county cooperators.

Of the roads now constructed to satisfactory standard on the 160 national forests 5,035 miles are forest highways, that is, forest roads of primary importance to the States, counties, or communities; and 9,250 miles are forest development roads, that is, forest roads of primary importance for the protection, administration, and utilization of the national forests. Forest highways are usually constructed by the Bureau of Public Roads, and to date have cost an average of \$12,304 a mile. Forest development roads, usually constructed by the Forest Service, have cost on an average \$1,274 a mile. The average mile of Forest Service trail cost \$200.

The forest highway systems now approved by the Secretary of Agriculture as representing the needs of the national forests for the next 10 years propose a total mileage of 15,092 miles. This total would include 1,299 miles of new road and 8,758 miles of road now in existence but requiring reconstruction or improvement. The forest development road systems approved by the Forester for the same 10-year period call for a total of 34,461 miles, including 13,593 miles of road now in an unsatisfactory condition and 11,618 miles not yet constructed. This plan calls also for the increase of the national forest trails to 104,370 miles. To put these systems into effect will require appropriations totaling \$179,939,872.

Irrigation Water from National Forests

The dependence of western farming on the run-off of the national forests has been studied by R. V. Reynolds of the Forest Service on the basis of the 1920 Census figures. The facts brought out by Mr. Reynolds's compilations are in part as follows: In the 12 western States containing

national forests 205,240 out of 552,940 farms are irrigated, and the irrigated farm land totals 17,861,735 acres. The run-off from the national forests waters 90.3 per cent of these irrigated farms and 88.6 per cent of this irrigated land. The annual value of the crops obtained from this land is \$621,360,229, or more than one-third of that of all the farm crops of the 12 States.

A Longleaf-Loblolly Cross

By Philip C. Kakcley, Southern Forest Experiment Station

A cross between loblolly and longleaf pine having characters intermediate between those of the parents was discovered some years ago by V. H. Sonderegger, then State superintendent of forestry for Louisiana. The new hybrid was described in the Journal of Forestry for November, 1922, by Prof. H. H. Chapman of Yale as promising high resistance to fire and hogs, remarkable growth, and unusual gum-flow. Professor Chapman proposed calling it Pinus Sondereggeri. A few seeds were collected from the hybrid, but they produced typical longleaf seedlings; and nothing more was done with it at the time.

Hundreds of "Sonderegger pine" seedlings have now appeared in the nursery of the Great Southern Lumber Co. at Bogalusa, La., from longleaf seed collected in longleaf-loblolly country in eastern Texas. Instead of being stemless like longleaf seedlings they are almost as tall as loblolly seedlings of the same age, and much stouter. Their needles are nearly as large as those of longleaf. The seedlings are remarkably vigorous, even in comparison with the justly celebrated slash pine. The company forester is donating the stock to the Southern Forest Experiment Station, and it is hoped that enough can be found to plant at least half an acre at Bogalusa. In addition, the station intends to plant some of the hybrids in a region beyond the range of either parent, to see whether they will "breed true" to Pinus Sondereggeri or, according to Mendel's law, yield two hybrid seedlings to one each of longleaf and loblolly.

Unusual Second-Growth Oak

In a study by the Appalachian Forest Experiment Station of second-growth oak stands in the southern Appalachians, one area was found near Wardensville, W. Va., in which cutting was being made. Only the larger trees were cut, and since these were black or scarlet oaks and the more valuable white oaks were left to replace them, the cutting enhanced the value of the future stand. One stand of white oak about 155 years old was found, ranging in height from 90 to 105 feet. This brought an excellent price as piling.

Most sawing in these second-growth stands was found to be exceedingly wasteful because of the heavy slabbing.

In this oak study, in which Dr. G. W. Hedcock of the Office of Forest Pathology cooperated, it was found that the trees most liable to serious heart rot are those that have been burned a second time, the old scars forming an entrance point for rapid decay. Young second-growth stands of oak protected from fire are commonly sound. In those that have been subjected to only a very light fire, the fire scars have healed over rapidly and little decay is to be found except in the sap-wood.

Gains Made by Lambs Grazed on Douglas Fir Cut-over Lands

By D. C. Ingram, U. S. Forest Service

As a means of measuring the usefulness of Douglas fir cut-over lands for sheep grazing, a number of lambs from an experimental band on the Columbia National Forest were weighed periodically during the summer of 1926 and the gains recorded. On June 8, 1926, when the sheep entered the cut-over area, 50 lambs were selected, 40 being average lambs and 10 the largest and fattest. The two lots were weighed separately with steelyards. They were weighed again on July 30 as they were moved from the cut-over range to high range, again on September 4 as they were returned to the cut-over range, and finally on September 20 when they were driven to the railroad for sale. The weights and gains were as follows:

Number:		Average weight, and average gain per day			
: of :		: since previous weighing, per head			
:days :Type of		:			
:since : range		: 40 average lambs : 10 top lambs			
:previ-: grazed		:			
Dates	ous	: since	Gain per :		Gain per
			Weight	day	
of	weigh-:	:previous	: Weight day		day
			(pounds)	(pounds)	
weighing	ing	:weighing	: Weight day		(pounds)
			(pounds)	(pounds)	
June 8	:	:	:	:	
July 30	:	52	Cut over	48.12	61.9
September 4	:	36	High range*	66.00	.344
September 20:	:	16	Cut over	69.27	.091
	:	:	#71.75	#.155	.100
	:	:			.025
	:	:			
	:	:	Average	.227	Average
	:	:			.200

*Eliminating 2 lambs orphaned during the summer, which weighed as a result 51 lbs. and 47 lbs., the average was 70.34, a gain of 4.34 lbs. in 36 days or .121 lb. per day.

#Likewise eliminating the orphaned lambs, the average weight on September 20 was 72.79, an average gain of 2.45 lbs. in 16 days or .153 lb. per day.

Better than one-third of a pound a day during the period from June 8 to July 30 is clearly a satisfactory gain. Against the greater fattening and milk-producing value of the feed on the cut-over land as compared with the high range must be figured the normally quicker gain of the younger lambs. The season as a whole was extremely dry, though feed was abundant in the early period of use. No "check" band of similar breeding was available for direct comparison, and, with all the factors that have to be considered, interpretation of the one season's figures is difficult. But the figures do show that the 50 lambs weighed gained an average of 19.72 pounds a head while grazing on the Douglas fir cut-over land; and if this gain was the average for the 1,000 lambs from the same band which were sold at 11 cents a pound, the forage on this cut-over area in the summer of 1926 was worth \$2,169.20 to the owner of the sheep. This valuation is of course incomplete because it does not cover the wool produced.

- - - - -

Administrative Men Help at Experiment Station

A forest supervisor, an assistant supervisor, and a ranger of the Intermountain National Forest District this summer were assigned for four weeks each to the Great Basin Grazing Experiment Station, to assist in experimental work. The scheme worked out very successfully. The station valued the assistance of these men, the opportunity to disseminate the results of its work, and the benefit of getting the administrative men's point of view. The "trainees" had a chance to become better acquainted with the purposes of the station's work, were prepared to understand more thoroughly the reports on its investigations, and learned some experimental methods that will be useful to them in administrative range studies. The station expects to be able to keep a number of such visitors busy each year, and hopes the system will be continued.

- - - - -

Attendance at Laboratory Short Courses

More than 1,000 men have been enrolled in the short courses given from time to time at the Forest Products Laboratory, Madison, Wis. Packers of bonbons and oil-well supplies, of chewing gum and automobiles, rubbed shoulders in the twenty-eighth course in boxing and crating, September 20-25. Five firms represented had had men in previous courses and one, represented this time by 2 students, had previously sent 19. Eastern, west coast, southern, and middle west manufacturers sent men to join the September class in the gluing of wood. The reorganized course in kiln drying was given for the second time in September and according to present plans will be repeated in January.

- - - - -

The National Advisory Committee for Aeronautics has transferred to the Forest Service the sum of \$2,500 to be used in a study of the resistance of glues to prolonged exposure under damp conditions. This is the committee's first transfer of funds for a study of this nature.

The preservation of wilderness areas in the Superior National Forest was assured by the decision of the Secretary of Agriculture, announced September 18, that at least 1,000 square miles in the forest, containing the best of the lakes and canoe routes, shall be kept free from roads. Elsewhere in the forest only such roads are to be built as will be needed, in connection with water routes and logging railroads, to protect the forest from fire.

- - - - -

Three recreational areas within the national forests were designated by the Secretary of Agriculture on September 24. They include the Mt. Shasta Recreational Area of 29,620 acres in the Shasta National Forest, Calif.; the Laguna Mountain Recreational Area of 11,495 acres within the Cleveland National Forest, Calif.; and the Mt. Baker Recreational Area of 74,859 acres in the Mt. Baker National Forest, Wash.

- - - - -

A survey of the fishing waters within the national forests in New Mexico has been undertaken by the U. S. Forest Service at the request of the game department of the State. It is planned to collect data showing the mileage of fish-supporting waters; the degree of present stocking; the species with which the waters are stocked; the species to which they are best adapted; and the amount of fishing.

- - - - -

A great many trees in Washington, D. C., have been killed recently as a result of extensive repaving of streets. Following a protest by residents, the Engineer Commissioner asked for a report by George B. Sudworth, dendrologist of the U. S. Forest Service, on the nature and extent of the damage being done to the trees. Mr. Sudworth found that in order to soften the old asphalt pavement so that it might be removed very quickly and hence at low cost the contractors were using a machine that applies 1,000 degrees of heat (Fahr.). This intense heat killed all the foliage of the overhanging street trees, and with them the winter buds and the cambial layer of the twigs for a length of two or three feet. This meant destroying this year's foliage and the present beauty of the trees, and will prevent the putting forth of foliage in the coming spring and necessitate extensive pruning of the trees in order to rejuvenate such of them as do not succumb.

- - - - -

Christmas trees are cut and yet left to grow, in the 16-acre juniper plantation which Frank Rush established 13 years ago at Cedar Creek on the Wichita National Forest, Oklahoma. The trees, which have attained an average height of 13 or 14 feet, are cut to within about a foot of the ground, one vigorous branch being left. Fed by a strong root system, this branch soon develops into a large tree.

- - - - -

GENERAL FOREST NEWS

Fire Weather Service in the Lake States

Studies of forest fire weather which have been started by the Lake States Forest Experiment Station and the Minnesota Forest Service were given an impetus this summer when the Weather Bureau stationed J. L. Lloyd at Duluth as an observer. During the fall of 1926 his work is confined to the establishment and equipment of observation stations in northern Minnesota, several of which have been functioning more or less since the spring of 1925. With the Minnesota stations completed it is expected to establish others in northern Wisconsin and in the upper peninsula of Michigan. According to present plans the stations will be equipped with the following instruments: maximum and minimum thermometers, anemometers, sling psychrometers, rain gauges, and hygographs. Observations will be reported by wire to Duluth at 7 a. m. daily during the period of serious fire danger. They will be correlated with regular Weather Bureau observations and used to amplify the regular forecasts, especially with respect to wind, temperature, precipitation, and, if possible, relative humidity. Predictions of fire weather will then be telegraphed to several points in each State for distribution to fire wardens, and if the project is sufficiently successful fire predictions may be sent out by radio.

- - - - -

Amount of Forest Land Increases

An increase of about 9,000,000 acres in forest land in the United States between 1919 and 1925 is shown by a preliminary report on the 1925 agricultural census. A decrease of 19,000,000 in the land area devoted to farm crops is shown for this period. The difference of 10,000,000 acres is allotted to pasture.

Shrinkage of crop areas in the South and in the eastern corn belt was partially offset by increases in the great plains and in parts of the upper portion of the Lake States region, New York, and New England. At the same time, however, in several counties in Michigan, New England, and New York some of the poorer crop lands reverted to pasture and some pasture lands went back to forest. Throughout the South, particularly in northeastern Missouri, and in the northern portion of the Lake States region, considerable forest land was cleared for crops. Some land was cleared also around Puget Sound and in the Willamette Valley in Oregon.

- - - - -

Nation-wide Blister-Rust Quarantine

A nation-wide quarantine to prevent the spread of white pine blister rust was put into effect October 1 by order of the Federal Horticultural Board. The new measure, known as Quarantine No. 63, replaces all other blister-rust quarantines and regulations. Nurserymen and others are now permitted to move white (five-leafed) pines, and currant and gooseberry plants, from one State to another only when such stock has been certified by their State nursery inspectors as free from blister rust; or, if the stock is from an area or State known to be infected with the blister rust, only under permit from the Federal Horticultural Board. The interstate movement of European black currants is not permitted under any conditions except within an area comprising 12 middle-western and southern States.

- - - - -

Stumpage Price Trends

Virgin longleaf pine rose to new price levels in 1925, according to the results of a study of stumpage prices in that year made by Charles W. Boyce of the U. S. Forest Service. The weighted average in the Lower Mississippi region was \$12.88 per M with a range as high as \$17.50 for small blocks of good timber easily accessible. Large areas requiring a period of years to cut sold for \$9 or \$10 per M.

For the first time, Oregon stumpage prices in 1925 reached approximately the same level as Washington prices. This indicates that in Washington the more inaccessible timber is now being cut, while the Oregon supply is becoming more accessible.

In the Northeast, despite severe competitive conditions, prices do not seem to have decreased. The volume of sales has, however, fallen off to a marked extent.

Stumpage prices in the North Carolina pine region show a decided drop in 1925 as compared with 1924, particularly in North Carolina pine. North Carolina pine lumber sales are largely confined to the Atlantic Coast cities - the point where Douglas fir can be sold more cheaply than anywhere else in the East. But few mills can compete with Douglas fir and make a normal profit. This condition has affected the prices of standing timber.

- - - - -

The monthly production of newsprint in the United States and Canada from May to September of this year averaged 300,000 tons. This is about 50,000 tons more than the monthly average in the same period in 1925, and nearly 75,000 more than that in a similar period in 1924.

The Range and Live-Stock Situation in the West

By W. R. Chapline, U. S. Forest Service

Range forage has been short this season throughout most of the range areas west of the Rockies, particularly in the Northwest and in parts of California. Many sheep had to leave the forest ranges early because of the exhaustion of the forage supply; some shortage in the winter supply of range and of feeds is expected; and as a result marketing of live stock has been unusually heavy. Rocky Mountain conditions on the whole have been fairly satisfactory; forage has been abundant and both cattle and sheep are in very good condition. Drying winds, however, have reduced the winter range supply. The Southwest started out with a highly satisfactory spring growth. Good summer rains, especially in New Mexico, brought abundant forage. With relatively small numbers of live stock on the range in New Mexico, cattle and sheep are both in good condition and there has been an improvement in the market for cows to restock ranges.

Through the West as a whole, the cattle and sheep market has been lower than that of 1925. Many lambs were contracted early, wethers selling at from 10 to 12 cents a pound and ewe lambs selling as high as $12\frac{1}{2}$ cents because of the considerable numbers being held for breeding. The dry summer has caused heavy runs from the range areas, and with lower weights on lambs more than the usual proportion are going as feeders. Values have also been affected, lambs from drought areas selling as low as $8\frac{1}{2}$ cents a pound. It is generally thought that conditions will for some time to come remain favorable for profitable production in sheep, with some improvement in the cattle industry. Mohair is selling at a price that allows excellent profits where good methods of production are followed, and Angora goats are in demand.

Barkbeetles Pick Fire-Retarded Pines

By F. P. Keen, Bureau of Entomology

One of the most serious after effects of summer fires in western yellow pine timber is the heavy killing of scorched trees by bark-beetles. There are records of 1000 per cent increase in beetle activity after fires. A recent survey of an area on Timber Mountain, in the Modoc National Forest, that was burned over in July, 1924, showed an average of 1,120 beetle-killed trees per square mile, while on adjacent unburned forest the loss averaged 300 trees per square mile. Cores from the live trees remaining on the burned area showed that their growth had been retarded in about the proportion that their leaf surface had been destroyed by the fire. The beetles attacked the scorched trees with slow growth. Measurements that have been made on thousands of pairs of cores from beetle-killed trees and adjacent trees of similar diameter have pretty conclusively shown the preference of the beetles for slow-growing trees.

Some Like 'Em Scorched

By H. E. Burke, U. S. Bureau of Entomology

One of the flatheaded borers, Melanophila atropurpurea, seems to follow forest fire and to delight in the smoke and heat. For a number of years western entomologists have confused this insect with Melanophila acuminata; but the real fire-eater differs from acuminata in having the wing covers tipped with a distinct spine.

During June, 1924, the timber on a hillside near Northfork, Calif., was thoroughly scorched by fire. By August 1, practically all of this timber was heavily infested with broods of various insects. Sections of wood were collected and Melanophila atropurpurea was reared in numbers from canyon live oak, California black oak, mountain mahogany, and incense cedar.

On November 16, 1919, F. B. Herbert found hundreds of beetles of this species flying around a brush fire near Los Gatos. Numerous beetles were crawling on scorched willow branches that were still hot and smoking. It seems to be the scorching, and not any particular quality of the host tree, that attracts the insects. Apparently they will attack any tree that is scorched.

Chinese Elm Succeeds in California and Texas

Chinese elm has demonstrated its ability to make satisfactory growth in California with a minimum of care, according to Woodbridge Metcalf, extension forester, and is recommended for trial in street and highway planting, ornamental planting, and windbreaks. A dozen trees of this species, which was introduced from China by the Office of Seed and Plant Introduction of the Department of Agriculture, were tried out in the forest nursery of the University of California in 1917. They made a height growth of about a foot in the first season, and all survived. Two years later three of these trees, then about 4 feet high, were set in tubs for ornamental purposes. Though subjected to great heat and left without water at intervals until conditions of an almost desert character were produced, they survived and grew 6 inches in height a year. In December, 1920, they were removed from the tubs, severely pruned, and set out on the college campus, where they have since remained undisturbed, receiving water about once a month during the dry season. In October, 1926, they had reached heights of 9 feet, 11 feet, and 16 feet. Two other trees set out directly from the nursery into the field grew to 12 feet and 19 feet in height in the same period.

A test of growing this species from seed was carried out at the California university with similar success. From 60 grams of seed (about 5,400 seeds) put in the seed bed, 86 good trees were obtained.

In January, 1924, 65 of these trees, then about 3 inches tall, were set out in a grassy plantation area which had been burned over in September, 1923. Here they received no irrigation or cultivation, and were severely browsed by cattle. All of them appeared dead the next fall, but several put on new shoots the following spring and are still alive and making slow recovery. Of 20 species planted on this site in January, 1924, Chinese elm is the only one of which any trees survived the dry season of that year. The rest of the Chinese elms raised from seed in 1923 grew to an average height of 18 inches in a transplant row. Two of the largest, transplanted to the campus in December, 1924, had reached a height of 6½ feet in October, 1926. These had very little irrigation during the dry season. Three others planted at the same time in the home garden and given adequate irrigation are now 10, 12, and 14 feet high. In general the Chinese elm makes a steady height growth in the San Francisco Bay region of 2 to 3 feet a year for the first five years. Of three trees about 3 feet high planted in front of a newspaper office at Lancaster, Calif., in the spring of 1925, one has grown to a height of 20 feet and the others are only slightly smaller. One of these trees bore a heavy crop of seed in 1926.

Chinese elm gives promise of being a good tree for shade and windbreak planting also in west Texas, according to R. E. Karper, assistant director of the Texas Agricultural Experiment Station, Lubbock, Tex. It has been given a 7-year test at the experiment station, and during the past 5 years 10,000 trees have been distributed to widely scattered areas of the State. Reports on its performance in these various places have invariably been favorable.

Chinese elm is a drought-resistant tree with an extensive surface root system. It has numerous small leaves, makes a dense shade, is easily transplanted, and makes remarkably rapid growth. While promising to be of considerable importance as a shade tree in other parts of Texas, it appears to be especially valuable for the western part, where there is practically no native shade tree suitable for either city or farm planting and where a dependable tree of such habits is badly needed.

A grove of California redwoods 250 miles north of San Francisco on the Redwood Highway, has been deeded to the State of California by Mrs. Kate Felton Neilson of San Francisco in memory of her father, the late United States Senator Charles N. Felton. The grove contains approximately 100 acres and more than 7,000,000 feet of redwood timber. It is situated at a bend of the South Fork of the Eel River. The gift was made through the Save-the-Redwoods League, which since its organization in 1918 has through appropriation and gift preserved more than 3,000 acres of redwood timberland.

Random Notes on the 1926 Seed Crop

By C. F. Korstian, U. S. Forest Service

Reports reaching the Washington office of the U. S. Forest Service indicate that the seed crop of forest trees this year has varied widely in different parts of the country. While these reports, coming in the form of news items from the district offices of the service and through the conversation of men who have traveled in different regions, are by no means complete, they are nevertheless of interest.

The crop of Norway pine seed in the Lake States is an almost complete failure. White pine has a fair crop in some sections, and jack pine is living up to its reputation of bearing seed almost every year. From the South comes the report that the longleaf pine crop is essentially a failure. The last heavy crop of seed from this species was that of 1920. The shortleaf pine crop is lean. A number of reports indicate an abundant crop of seed of heavy-seeded hardwoods, particularly the oaks and hickories.

 : Rumors from California indicate that in contrast to the exceptionally heavy seed crop of almost every species in the Sierra region the 1926 crop of the sugar and yellow pines is in places rather lean, while the Jeffrey pine crop is generally good. From Montana and northern Idaho comes the word that there is a good crop of western white pine seed, but that for some unknown reason the squirrels are not cutting the cones down in as large numbers as usual, which makes it difficult to collect the seed. Indications in this region point to the possibility of a crop of western white pine seed next year.

From several places in Colorado it is reported that there is a light crop of Engelmann spruce, but that yellow pine is a failure quite generally.

 : The Appalachian region is experiencing the heaviest crop of red spruce seed that has occurred in the region for five or six years. Bountiful crops of southern balsam, fir, and Carolina hemlock are also noteworthy. It has been suggested that the unusually heavy crop of Carolina hemlock seed may be due in part to the intense drought of last summer.

 : The Douglas fir crop seems to be rather spotty, in some places failing totally.

 In British Columbia, local Governmental agencies have been collecting large amounts of Douglas fir seed to meet requests from many parts of the British Empire. It is reported that there has been enough of a crop in the Fraser River Valley to permit the collection of more than 1,000 pounds of seed. This entire collection has been obligated, without satisfying the demand.

Stop Watch Shows Small Trees Lose Money for Lumbermen

By using a stop watch to test the time consumed in making lumber out of large and small trees, and consequently the operation costs, W. W. Ashe of the U. S. Forest Service has demonstrated that large trees are the money makers and that much of the profit on the large trees is lost through logging and cutting small trees. Two trees standing cheek by jowl may be cut at the same mill and one show a loss of \$12 a thousand while the other makes a profit of \$25. If the manager knew he was losing \$12 a thousand on one of these trees he would have a nervous breakdown; but he usually knows only the average return. The profit on the big tree hides the loss on the little one. Only a stop watch and a check of the grades of lumber from each will drag the loss from its hiding place. Ashe has used the stop watch and what it revealed is of tremendous importance not only to the lumbermen, but to everyone interested in the future of the forests. His tests show that cutting small trees is unprofitable business; so that if the lumberman leaves them to grow he not only provides for future timber crops and future prosperity for himself and for the community but makes more money now.

Under a logging cost of \$25, such as generally prevails at larger operations in the Appalachians, yellow poplar trees 13 inches to 10 inches in diameter show a loss of from \$2.00 to \$12.47 per thousand feet; whereas trees from 14 inches to 30 inches in diameter show profits of from 50 cents to \$27.10 according to size. This is because the small trees cost so much more per thousand board feet to log and manufacture and because when they are manufactured they produce inferior grades of lumber and bring lower prices. While it costs \$25 a thousand feet to manufacture lumber from 21-inch trees, it costs at the same operation nearly \$40 a thousand feet to manufacture lumber from 10-inch trees. And the grade of lumber obtained from the big tree is worth nearly twice as much as that from the small tree.

Leaving the small trees in the woods not only increases present profits but is a means of providing greater future profits; for the smaller trees when released from competition for light and soil moisture by having the larger trees removed increase in size and value at an extremely high rate. New crops of timber are thus provided and the sawmill owner is enabled to continue his operation on a permanent basis.

Mr. Ashe timed many crews of loggers to get his figures, which are based on the conditions ordinarily found in logging operations. The stop watch was held on felling, cutting up, skidding, and hauling logs, sawing at the mill, and other parts of the process of turning trees into lumber. The investigation was made in the Appalachian hardwood region, but the conclusions apply generally. In Arkansas seven lumber companies are reported to have come to the conclusion that there is little or no

profit in cutting small pines and to have put their operations on a permanent basis, leaving for future growth not only saplings but trees of a size well within the class that has been assumed to be merchantable. This is being done not from any altruistic motives, nor from a desire to create a friendlier feeling toward the lumber industry, but because it pays.

- - - - -

Delegation Recommends More Federal Fire Protection Funds

A delegation of 16 men representing private and public interests directly concerned with forest fire protection met in Washington, D.C., on October 7 to confer with President Coolidge and General Lord, Director of the Budget. The majority of them came from the Northwest, where the recent fire season was particularly severe; but the East, the South, and the Lake States were also represented. They told the President that "protection of life, resources, and reforestation from forest fires is a grave responsibility shared by private, State, and Federal agencies and one not being met with satisfactory efficiency." A. W. Laird of Idaho as spokesman for the delegation said that the States and private timberland owners, which under the provisions of the Clarke-McNary Law had expected to assume three-fourths of the responsibility for protecting lands in which joint Federal, State, and private interests exist, are now spending about \$3,775,000 for this purpose. The Federal Government if it were paying its proportional share under the Clarke-McNary plan would be spending \$1,250,000 a year, instead of which its appropriation for the present year is only \$710,000. Mr. Laird said also that because the Federal Government now provides only \$25,000 a year for the protection from fire of 2,600,000 acres of timbered land in the public domain, the States and private owners are put to an expense of \$67,000 a year to forestall being burned out by public domain fires. He emphasized the wastefulness of denying suitable Federal appropriations for forest protection, when this denial inevitably makes necessary huge emergency appropriations to cover the expenses of fighting fires. He also suggested that the fire-protection activities of the Government ought to be coordinated and that they ought to include adequate provision for fire-weather warnings.

The increases in Federal fire-protection appropriations called for by the recommendations of this group total \$845,000.

- - - - -

A special committee on forest-fire prevention was recently created in the National Fire Waste Council, which for some years has carried on a general fire-prevention campaign. The work of the council is sponsored by the Chamber of Commerce of the United States. The council represents eighteen national organizations and three Federal bureaus. The U. S. Forest Service has accepted an invitation to join the council, and will be represented on it by Forester Greeley and Assistant Forester Redington.

New England Council Puts Forestry on Its Program

Forestry had a prominent place on the program of the fourth quarterly meeting of the New England Council, held September 24-25 at Bretton Woods, N. H. This council is a sort of super-chamber of commerce for the six New England States, formed a year ago at the instance of the governors of the States in order to bring the industrial interests of the region together on questions affecting regional development. Its twelve members represent water power, textile, manufacturing, and other major industrial interests. The subject of forestry was brought before the council at its recent meeting by State Forester John H. Foster of New Hampshire, who submitted a New England forestry program prepared jointly by the State foresters of the six States. Its chief points are as follows:

1. Better protection against forest fires, insects, and diseases.
2. Increased public ownership of forests, including town forests.
3. An adjustment of forest taxes so as to encourage private forest practice.
4. Adequate State nurseries for the production of trees at low cost.
5. Support of forest investigations through the Federal Forest Experiment Station at Amherst and its cooperators.
6. Better methods of marketing forest products and fostering the idea of marketing associations among woodlot owners.

The council passed a resolution recommending cooperation between State councils and the forestry and wood-using interests in working out plans for forest conservation and development, and decided to appoint legislative committees representing its several State sections to consider the recommendations made by the State foresters, with a view of getting behind a legislative program in each State.

- - - - -

Foresters Meet in the Green Mountains

More than one hundred foresters were gathered together at the summer meeting of the New England and New York Sections of the Society of American Foresters, held at Bread Loaf Inn on the eastern slope of the Green Mountains of Vermont, August 22-26. All day-time sessions were devoted to field trips through which the visiting foresters learned much about Green Mountain forest conditions and about the work of the Vermont State Forestry Department.

Bread Loaf Inn is located in Battell Forest, a heavily wooded tract of 30,000 acres owned by Middlebury College which is being operated on a sustained yield plan with J. J. Fritz as forester. Visits were made to cutting operations on this forest, to several sawmills and woodworking plants in its neighborhood, and to the State nursery near Essex Junction where 3,000,000 transplants are being prepared for shipment next spring.

Among the many forest plantations visited were those on the Billings Estate at Woodstock. Some of the plantations on this estate of 900 acres date back to 1880.

- - - - -

The village of Boardman, for years the center of the lumber industry in Columbus County, N. C., is soon to be abandoned. It was established about 40 years ago by the Butters Lumber Co., which had bought up many acres of swamp land heavily timbered with cypress, pine, and gum, reaching from far down in South Carolina almost to the edge of Cumberland County, N. C. Until then it had been generally believed that most of the timber in these marshes could never be removed; but the Butters company dredged canals through the swamps and was soon sending great drives of logs down to Boardman, to be cut into lumber of all types and shipped to many parts of the world. In the course of years the center of operations has so shifted that it is no longer economical to haul by rail to the old plant, and the machinery there has become outdated. The village is therefore being removed to Sand Cut, Bladen County, where a smaller plant is being installed.

- - - - -

Locomotives of the Southern Pacific Co. crossing the California Sierras between Reno and Sacramento were equipped this summer with automatic track sprinklers, as were also those on the Shasta division. By extinguishing sparks generated by heated brake shoes, the spray from the sprinklers greatly reduces fire hazards. Incidentally, it keeps car wheels cool and adds considerably to the life of tires.

- - - - -

The Southern Paper Co., which employs P. N. Howell as forester, has set aside a tract of 15,000 acres in the northwestern corner of Jackson County, Miss., as a reforestation and conservation area. This tract was cut over some thirty years ago. The second growth consists chiefly of longleaf pine, and it is believed that a fairly well-stocked stand of this species will develop if fire and hogs are kept out. A steel lookout tower has been erected and the tract is being inclosed with hog-proof fencing. Fire lines are to be established and a fire-control organization will be maintained in the dangerous seasons.

- - - - -

FOREIGN NOTES

From an English Point of View

(Quoted from an editorial in the Quarterly Journal of Forestry for the Royal English Arboricultural Society, July, 1926)

The real danger point *** is the United States of America. Endowed with wonderful forests which seemed inexhaustible to the early settlers, and, indeed, to most Americans up to the present century, the Americans acquired habits which entailed the most extravagant use of timber. At the present day, when the per capita consumption in Britain is about 15 cubic feet, or say 20 to 25 cubic feet of standing timber, the per capita consumption in the United States is between 200 and 250 cubic feet. The average American uses ten times as much timber as the average Briton. About half of this huge amount is firewood and most of the remainder is sawn timber, the total being made up by pulp-wood, fencing material, etc.

That this can not go on indefinitely, even with her present population, is clear from the simplest mathematics. With a population of rather over 100 million, her timber consumption exceeds 24 billion cubic feet, whereas the annual increment for her forests is estimated at from 4 to 5 billion. There is a deficit of 20 billion cubic feet a year, and though she still has large resources amounting to something like 700 billion cubic feet, this would become exhausted at the present rate in less than 40 years. Already, from having been a large exporter of timber, the U.S.A. has become, on the balance, a timber-importing country, and though most of her imports come from Canada, she has for some years imported paper and wood pulp and is now importing timber from northern Europe. If she were to continue to use timber at the present reckless pace she would absorb more than all the exportable margins of all the coniferous forests of the world *****.

The position with regard to future timber supplies is affected by so many factors, the exact working of which is difficult to prognosticate, that no one can state with any confidence the exact course that events will take. But *** the following generalizations may be enunciated:

1. Consumption in Britain is not likely to increase very materially and may even decrease. We may expect the same tendency to become apparent in other North European countries which are chiefly responsible for timber consumption. Left to herself, the European supplies of softwood timber may be expected to equal the demand at a price somewhat higher than that ruling at present.

2. Consumption in North America has greatly exceeded growth, and there is an enormous debit balance in her supply. So far this balance has been met almost entirely by exploiting the very large supplies which were found in the continent when the first white settlers appeared, and there has been no considerable import of timber from any other source. As this virgin forest becomes exhausted, either consumption will have to be very severely curtailed or immense quantities will have to be imported from Europe or Asia. It is only in the industrial parts of the continent that the high prices, which will result when timber is imported from long distances, can be economically met; and we have evidence that, in industrial areas which are far removed from large supplies of timber, the average consumption has already been reduced to about a third of the normal for the U.S.A. Consequently, we may expect consumption in the United States to fall off very considerably, but at the same time America is likely to compete more and more keenly as a purchaser in the European timber markets.

3. It seems clear that if present prices were to continue the demand for timber would, in less than half a century, far exceed the supply. By a natural economic law this tendency will be compensated for by a rise in price, which will, at the same time, reduce demand and increase supply by making available timber which is at present unmerchantable. Much care will, however, be needed to prevent the excessive cutting which a rise in price will stimulate, and conservative schemes of management under Government control, such as have already been adopted in Germany, Sweden, and Finland, will have to be instituted in all the chief forest countries. At the same time the rise in price of timber should be such as to justify the British Government and British landowners in adopting planting schemes so as to have mature timber in their possession when the competition for the world supplies becomes keener than it is today.

(The author of the editorial is of the opinion that the use of substitutes and preservatives, and curtailed per capita consumption through rise in price, may check the present tendency, but believes that there is undoubtedly cause for disquietude.)

- - - - -

A contract has been signed by the Hon. Honore Mercier, Provincial Minister of Lands and Forests for Quebec, with a French hydroplane company for a complete survey within the next two years of the forest resources of the Gaspe Peninsula.

- - - - -

Lumber imports into Australia in the year ended June 30, 1926, reached the record total of 516,414,000 board feet, or 114,000,000 feet more than in the preceding year.

Foresters Defend a City

In French Morocco, before the city of Mogador, foresters are waging successful war against sand dunes more than 300 feet high that have been threatening the city. These dunes were advancing at the rate of 60 to 90 feet a year, sometimes more. The sand was drifting in over the roads and walks of the city and filling up conduits, and had already "sanded up" a shrine formerly much visited by pilgrims and a palace of the sultan.

French foresters have made great progress in stopping the advance of the dunes. Their method is first to cover the slopes of the dunes completely with the branches of tamarisk, acacia, retama, rest-harrow, Phoenician juniper, etc.; then to shovel enough sand on these to hold them in place against the force of the winds; and finally to sow or transplant the same and other species during the rainy period from September to January. They have used especially for planting Acacia cyanothylla, Andryala pinnatifida, Lotus commutatus, Polycarpea nivea, Psamma arenaria, Retama Webbii, Ononis angustissima, and Juniperus phoenicea. An attempt was made to use the castor oil plant with the idea of getting a double return in oil and protection, and in 1925 considerable oil was produced, which was used by the air service. This plant, however, gives way to other species and shows a tendency to be crowded out. In the struggle for dominance the Retama Webbii has been most successful in some places, reaching a height of 5 or 6 meters; in other places the Phoenician juniper has done best and bids fair to establish a productive forest on the land as well as arresting the progress of the dunes.

(Resume of an article by Paul Jaccard in the Swiss Forestry Journal)

Forest Scouts in Africa

In tropical Africa the evils resulting from deforestation have led an English forester, R. St. Barbe Baker, to form a tree-planting and forest-conservation society called "The Men of the Trees," organized on the plan of the Boy Scouts and drawing its membership chiefly from the native tribes. Through this society nurseries have been established and last year it was reported that more than 9,000,000 trees were planted by voluntary labor. The oath of the organization is

"I promise before N'gai
To do at least one good deed each day
To plant ten trees a year, and
To take care of trees everywhere."

The plan is reported to be a great success, the insignia, ritual, secret handgrip, and password attracting the natives in great numbers and the work done for a common purpose not only helping the forestry movement but acting as a peacemaking and civilizing influence.

The society is endeavoring especially to put an end to the custom of cutting and burning away a piece of forest, planting a crop or two, and then abandoning the land to repeat the process.

The society has been introduced into England and sponsors camps in which tree planting and forest protection are made the main interest.

Climatic and Social Influence of Forests

The following comment on the value and relationship of forests to human society is made by A. F. Tigerstedt of Mustila, Finland, who contributes a chapter in English in volume 24 of the publications of the Society of Forestry in Finland:

"From many points of view *** the subject is really worth more attention than has been bestowed upon it hitherto. It is decidedly in the interest of the whole civilized world to preserve a huge belt of forest-clad ground round the frozen regions of the North Pole, and it is the author's conviction that if the northern forests should once be destroyed through war, revolution, or bad management, the climate of the temperate zone would be disastrously affected and the whole fate of humanity altered."

British Columbia Supplies Tree Seed for New Zealand and England

A shipment of 3,200 pounds of western yellow pine seed, gathered in the vicinity of Lytton and Kamloops, B. C., and extracted at the government seed-extraction plant at New Westminster, was sent to Wellington, New Zealand, in September. Western yellow pine seed is being collected at Kamloops for another shipment to New Zealand; and the New Westminster plant is preparing Douglas fir, red cedar, hemlock, and Sitka spruce seeds for the British Forestry Commission. According to consular reports, 200,000,000 seedlings from British Columbia have been planted in England during the past four years.

PERSONALS

James O. Hazard has joined the forestry staff of the State of Virginia. He is stationed at Charlottesville and has taken charge of the State forest nursery there. His first undertaking in his new field is a study of different sections of the State with the object of finding where reforestation is most needed and working out plans for building up popular interest in forest planting.

- - - - -

K. E. Barraclough on August 1 left the position of blister rust control agent for Rockingham County, N. H., for that of extension forester for New Hampshire. His former position is now filled by Lewis C. Swain, of Exeter.

- - - - -

E. L. Scovell, formerly assistant forester of New Jersey in charge of extension forestry, has transferred to the Agricultural Extension Service as extension specialist in farm forestry, with headquarters at New Brunswick, N. J. E. B. Moore, a 1926 graduate of the Yale Forest School, was appointed to the position left vacant by Mr. Scovell, and will carry on cooperative work in forestry with New Jersey landowners not included in the farm forestry classification.

- - - - -

John R. Cuno, for the past six years a member of the Washington office of forest products of the U. S. Forest Service, has joined the section of timber physics of the Forest Products Laboratory, Madison, Wis.

- - - - -

W. H. Swanson is leaving the staff of the U. S. Forest Products Laboratory, Madison, Wis., to accept a position on the research staff of the Champion Fibre Co. of Canton, N. C. He will take charge of the company's research in the sulphite pulping process, which was the field of most of his work at the laboratory. Mr. Swanson is a graduate of the forestry division of the University of Minnesota, and came to the laboratory in 1920 from the General Motors Co.

- - - - -

Robert P. McLaughlin, a graduate of the Yale Forest School, has accepted a position on the faculty of the Forestry Department of the Michigan Agricultural College. He is taking the place left vacant by the resignation of Paul Herbert, now a member of the forest tax investigative staff of the U. S. Forest Service.

- - - - -

Charles R. Hursh, forest ecologist, has joined the staff of the Appalachian Forest Experiment Station. Doctor Hursh received early training at the University of Missouri and was later a student at the University of Minnesota, where he engaged in a study of the biochemical nature of the resistance of plants to disease in which the university cooperated with the Bureau of Plant Industry of the Department of Agriculture. He has held fellowships at Washington University, Pasteur Institute in Paris, and the Boyce Thompson Institute for Plant Research at Yonkers, N. Y.

Louis J. Pessin, another forest ecologist of unusual training and experience, has likewise accepted appointment to the Appalachian station. Dr. Pessin started in forestry at the University of Georgia but switched to botany, and followed his college work with studies in plant physiology at the Missouri Botanical Garden. He participated in a botanical expedition to Jamaica, has engaged in research at the Desert Laboratory of the Carnegie Institution, and has held assistant professorships at the Mississippi and Texas Agricultural Colleges.

- - - - -

Alfred E. Emerson, professor of ecology at the University of Pittsburgh, has been granted a Guggenheim fellowship for a year's study in Europe on the phylogeny of termite castes. Doctor Emerson will visit termite specialists and museums in Italy, Sweden, and Denmark, and will study the primitive Hodotermes in the field in Tunis.

State Forester Grover M. Conzett of Minnesota has returned to his office after an illness of several months.

- - - - -

Harold C. Bolyea, of the faculty of the New York College of Forestry, Syracuse, N. Y., left this country in September to spend his sabbatical year in Europe.

- - - - -

Supervisor A. G. Hamel of the Pike National Forest is transferring to the Superior National Forest. His former post is to be taken by E. S. Keithley.

- - - - -

Prof. Jordan G. Lee, of the Forest School of the University of Louisiana, has returned to duty after a prolonged illness.

- - - - -

Reuben W. Smith has resigned as assistant professor of wood preservation at the New York State College of Forestry, Syracuse, N. Y., to become manager of the consulting department of the Protexol Corporation of New York and Kenilworth, N. J. The position left vacant at Syracuse has been filled by George P. Kramer, a member of the 1926 class of the Yale Forest School.

- - - - -

Mrs. Ernest R. Latham of Grand Ledge, Mich., has been appointed national chairman of conservation, General Federation of Women's Clubs, to succeed Mrs. W. W. Milar of Akron, Ohio.

- - - - -

R. F. Copple, assistant in grazing research in the Southwestern National Forest District, has been granted a short leave of absence to assist Prof. A. E. Aldous of the Kansas Agricultural College in reestablishing the native pasture work of the Kansas State Agricultural Experiment Station.

- - - - -

Robert S. Campbell, junior range examiner on the Jornada Range Reserve, Las Cruces, N. Mex., has been granted a leave of absence to accept a scholarship at the University of Chicago. He will spend the year on work in botany which will be credited toward a Ph. D. degree.

- - - - -

John W. Keller, chief of the Bureau of Forest Extension, Pennsylvania Department of Forests and Waters, has been appointed a member of the committee on reforestation of the American Mining Congress.

- - - - -

Gilbert Stewart, a member of the 1926 class of the Yale Forest School, has been appointed to the faculty of the forestry department of the University of Maine, at Orono, Me.

- - - - -

George Rupp, a graduate of the Yale Forest School, has been promoted to the grade of assistant professor in forestry at the State College of Pennsylvania. This summer he had charge of the sophomore camp of the forestry department of the college, at Sheffield, Pa.

- - - - -

Gerhard Kempff of the Northern Rocky Mountain Forest Experiment Station has been granted leave of absence until June, 1927, and is spending the current school year in research on the Harvard Forest.

- - - - -

V. H. Sondercogger has resigned as vice president and southern manager of Banzhaf and Watson, of Milwaukee, Wis. He will continue to make his home in New Orleans.

- - - - -

Gordon C. Hutchings, who was graduated in forestry at the Colorado Agricultural College last spring and who has been forest guard at Alder Springs, has accepted a research fellowship in forestry at the Iowa State College of Agriculture.

- - - - -

Correction: In the Forest Worker for September, 1926, it was stated through oversight that R. W. Hayes, who recently became a member of the faculty of the Forest School of the University of Louisiana, is a forestry graduate of the University of Iowa. Mr. Hayes's alma mater is the Iowa State College of Agriculture.

- - - - -

BIBLIOGRAPHY

Grazing Time on National Forest Ranges

When to start grazing and when to stop is the main theme of the new grazing study by Arthur W. Sampson and Harry E. Malmsten, "Grazing Periods and Forage Production on the National Forests," Department of Agriculture Bulletin 1405.

"Early yield of forage," states the bulletin, "is comparatively small if the herbage is cropped when its average height is 4 inches or less. Grazing when the plants are at this stage stunts the vegetation, and does not satisfy the hunger of the animals because of the low feed value of the short succulent forage. The high succulence and comparatively low nutritive value of young herbage also sometimes cause serious livestock losses early in the spring. As a general rule the grasses should be about six inches in height before grazing begins, and the earlier-maturing plants should have flower stalks showing."

"Grazing closely twice or even three times in a season, provided the first grazing is late enough and the intervals are sufficient for the vegetation quite to recover from each cropping, ordinarily does not seriously affect the yield and vigor of the plant cover. Grazing the range satisfactorily at the time of vegetative readiness and again in the autumn at the end of the summer grazing period is not a detrimental practice."

The grazing seasons giving the best results in the central Wasatch region are: Oak-brush, May 20 to June 9 and October 1 to October 15; aspen-fir, June 10 to July 9 and October 1 to October 15; and spruce-fir, July 10 to September 30.

The bulletin includes practical suggestions for the management of stock on the range, as well as a discussion of the forage types found on the ranges in the Wasatch Mountain region, the relation of climate to grazing seasons, and the experimental foundation on which the recommendations regarding grazing seasons are based.

Copies of the bulletin may be obtained from the U. S. Forest Service, Washington, D. C.

Additional copies of the 1926 grazing research program of the U. S. Forest Service are being mimeographed and will be available for distribution outside of the service. Requests should be addressed to the Washington office of the Forest Service.

Forestry for the Private Owner

A new book on "Constructive Forestry for the Private Owner" by Dr. J. J. Crumley, associate in forestry at the Ohio Experiment Station, has been gotten out by Macmillan. This book is a popular treatment of the whole range of forestry from the point of view of the farm woodland owner and of the teacher of general courses in forestry. It is easy to read and contains much worth-while information, particularly on hardwood forests and their reproduction.

Hoo-Hoo Fire-Prevention Booklet

To paraphrase a popular song of the day, "careless and sorry" seems to be the perennial condition of the American people. A 12-page booklet, which came forth from the press modestly without title, has been issued by the Order of Hoo-Hoo to bring home to the reader how careless Americans are with fire in the woods and how "every person of every age, in every stratum of society, and of both sexes" suffers when timber burns. The booklet has large type, good pictures, and easily read facts about forests and forest fires.

A new lantern-slide series on chestnut blight has been prepared by the Office of Cooperative Extension Work and the Bureau of Plant Industry. This set, No. 199, includes 40 slides illustrating the importance of prompt utilization of chestnut timber suitable for poles and lumber, and is accompanied by notes. Requests should be addressed to the Office of Cooperative Extension Work, U. S. Department of Agriculture, Washington, D. C.

A bibliography on slash disposal has been prepared by Dr. Perley Spalding, consulting pathologist at the Northeastern Forest Experiment Station, and is available for distribution in mimeographed form. Requests should be addressed to the U. S. Forest Service, Washington, D.C.

Recent Books and Pamphlets

Bailey, H. L.: Important tree insects of Vermont. 51 pp. illus. (Vermont Department of Agriculture. Bulletin no. 35.) Montpelier, Vt., 1925.

Brown, H. P.: An elementary manual of Indian wood technology. 121 pp. illus., pl. Central pub. branch, Calcutta, 1925.

Hawley, L. F., and Wise, L. E.: The chemistry of wood. 334 pp. diagrs. Chemical Catalogue Co., Inc., N. Y., 1926.

Helpenstine, R. K., jr.: Quantity of wood treated and preservatives used in the United States in 1925. 40 pp. diagrs., tables. American Wood-preservers' Association, Madison, Wis., 1926.

Hiley, W. E.: The financial return from the cultivation of Scots and Corsican pines. 32 pp. diagr. (Oxford University, Imperial Forestry Institute. Oxford forestry memoirs no. 6.) Oxford, Eng., 1926.

Howard, S. H.: Notes on artificial regeneration in north India. 37 pp. pl. (Indian forest records, vol. 12, pt. 9.) Calcutta, 1926.

International Institute of Agriculture, Bureau of Statistics: Forests and forestry: statistical and other information for certain countries. 425 pp. Rome, 1925.

MacDougal, D. T.: The hydrostatic system of trees. 125 pp., illus., pl. (Carnegie Institution of Washington. Publication no. 373.) Wash., D. C., 1926.

New Zealand State Forest Service: Annual report of the director of forestry for the year ended 31st March, 1926. 39 pp. illus. Wellington, N. Z., 1926.

Poland - Ministère de l'agriculture et des Domaines de l'Etat: Les Forêts en Pologne. 75 pp. illus., maps. Varsovic, 1926.

Quebec Department of Lands and Forests, Forest Protection Service: Report on the protection of the forests during the year 1925. 63 pp. pl., tables, diagrs. Quebec, 1926.

Robertson, C. C.: The trees of extratropical Australia. 265 pp. pl., maps. Govt. printer, Cape Town, S. Africa, 1926.

Sabroe, A. S.: Forestry in Denmark: a guide to foreigners. 64 pp. Danish Forestry Society, Copenhagen, 1926.

Stahl, R. M.: The Ballinger-Pinchot controversy. 138 pp. (Smith College studies in history, vol. 11, no. 2.) Northampton, Mass., 1926.

Articles in Periodicals

American Forests and Forest Life, Aug., 1926.—With the ranger naturalists; the national parks create a new educational service for visitors, by A. F. Hall, pp. 451-454, 429, 510-11. Sept., 1926.—Forest fires and recreation, by S. T. Dana, pp. 515-520, 551; How Maryland cares for her roadside trees, by F. W. Besley, pp. 539-541, 550-551. Nov., 1926.—The forest's enemies in the sea, by G. M. Hunt, pp. 655-658, 682; Logs and leather: the chestnut from tree to tannin, by M. A. Mattoon, pp. 669-671.

American Lumberman, Sept. 11, 1926.—Modern woods methods perpetuate timber supply, by A. Cary, pp. 58-60. Oct. 16, 1926.—Relation of size of tree to logging costs, stumpage values, and profits, by W. W. Ashe, pp. 73-74.

Australian Forestry Journal, July, 1926.—Tree planting and the science of forestry, by R. D. Hay, pp. 173-179.

Ecology, Apr., 1926.—Influence of certain soil and light conditions on the establishment of reproduction in northeastern conifers, by B. Moore, pp. 191-220. July, 1926.—Measurement of environmental factors in the tropical rain-forest of Panama, by W. C. Allee, pp. 273-302.

Farm Mechanics, Sept., 1926.—Treated timber for farm use, by R. K. Helphenstine, jr., pp. 28, 30.

Four L Lumber News, Sept., 1926.—Sitka spruce, by E. J. Hanzlik, pp. 7, 39-40.

Hardwood Record, Oct. 10, 1926.—Historical aspects of the tropical American forests, by C. D. Mell, pp. 26, 28, 48.

Illustrated Canadian Forest and Outdoors, Sept., 1926.—Where does forestry gospel fall short? by D. M. McKenzie, pp. 497-498, 540.

Indian Forester, July, 1926.—Fire protection in plantations, by G. S. Shirley, pp. 317-321. Sept., 1926.—An attempt to analyze the effects of grazing on forest conservation in the Central Provinces, by C. M. Harlow, pp. 459-465.

Industrial and Engineering Chemistry, Sept., 1926.—Fifty years' progress in the pulp industry, by J. D. Rue, pp. 917-919; Fifty years of wood distillation, by L. F. Hawley, pp. 929-930.

Journal of Forestry, Oct., 1926.—Wanted: dirt foresters, by W. Shepard, pp. 623-626; The mission of forest research, by S.T. Dana, pp. 667-672.

Journal of Geography, Oct., 1926.—The cork oak, by W. O. Blanchard, pp. 241-249.

Nation's Business, Sept., 1926.—The lumberman puts conservation into practice in the woods, by H. Schott, pp. 23-25.

Paper Mill and Wood Pulp News, Sept. 18, 1926.—A semichemical pulping process, by J. D. Rue and others, pp. 10, 12, 39-40; The red mill in the pulp and paper industry, by J. D. Rue and S. E. Wells, pp. 14, 16.

Proceedings of the American Society of Civil Engineers, Sept., 1926.—Unit stresses in timber, by J. A. Newlin, pp. 1436-1443.

Timberman, July, 1926.—Log scale versus lumber tally, by M. Bradner and P. Neff, pp. 46-48, 50-52; Marketing problems of tropical hardwood exploitation, by A. W. Betts, pp. 173-182. Aug., 1926.—Aerial photographic surveying, by W. C. Brubaker, pp. 41-42.

U. S. Department of Agriculture, Journal of Agricultural Research, Oct. 1, 1926.—Age classes of western white pine planting stock in relation to aspect of planting site in northern Idaho, by W.G. Wahlenberg, pp. 611-619.

U. S. Department of Agriculture, Monthly Weather Review, July, 1926.—Lightning and forest fires in the northern Rocky Mountain region, by H. T. Gisborne, pp. 281-286.

West Coast Lumberman, Aug. 15, 1926.—Utilization studies in the Douglas fir region, by W. H. Gibson, pp. 30, 32, 57.

Recent Publications of the Forest Service

Department Bulletins: 1430, Financial Limitations in Employment of Forest Cover in Protecting Reservoirs; 1437, Red Alder of the Pacific Northwest; 1436, Utilization of Dogwood and Persimmon.

Miscellaneous Circular 75, Harvesting Timber Crops in the National Forests of the East and South.

Map Folders: California National Forest; Eldorado National Forest; Helena National Forest; Tahoe National Forest; Mount Baker National Forest (reprint); Oregon Caves-National Monument (reprint).

Miscellaneous Publications: Law Enforcement on National Forests--California District; National Forest Areas.

National Forest Administrative Maps: 1/4 inch, Crook, Lassen, Washakie; 1/2 inch, Manti.

